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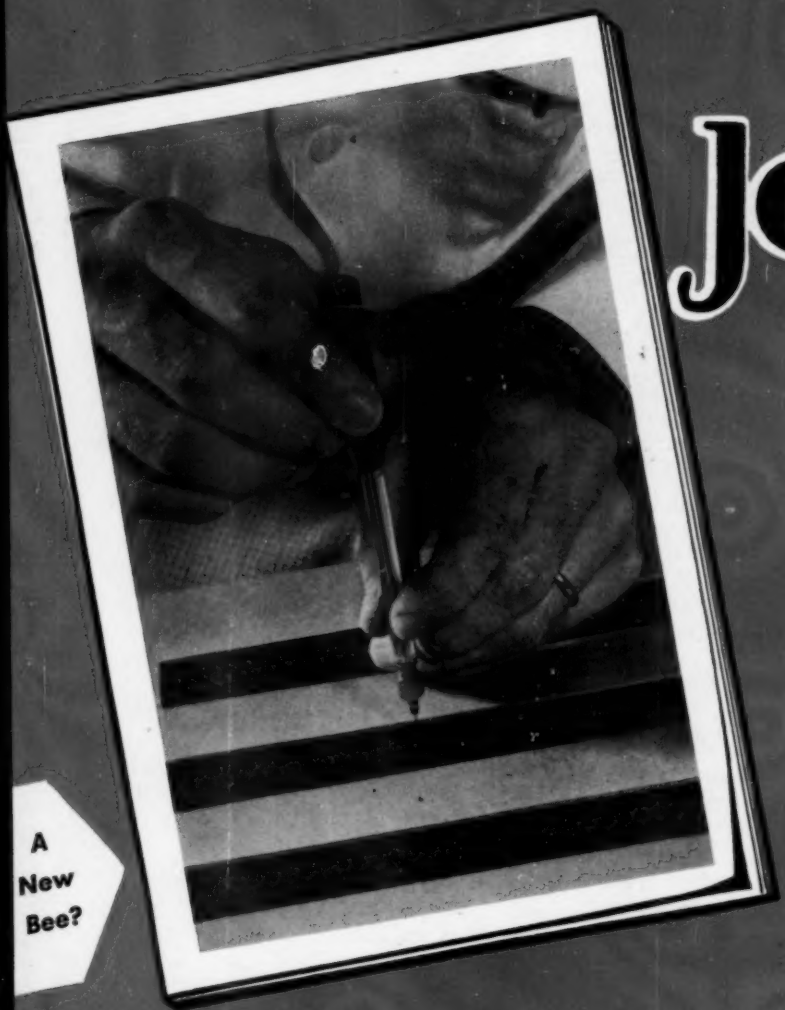

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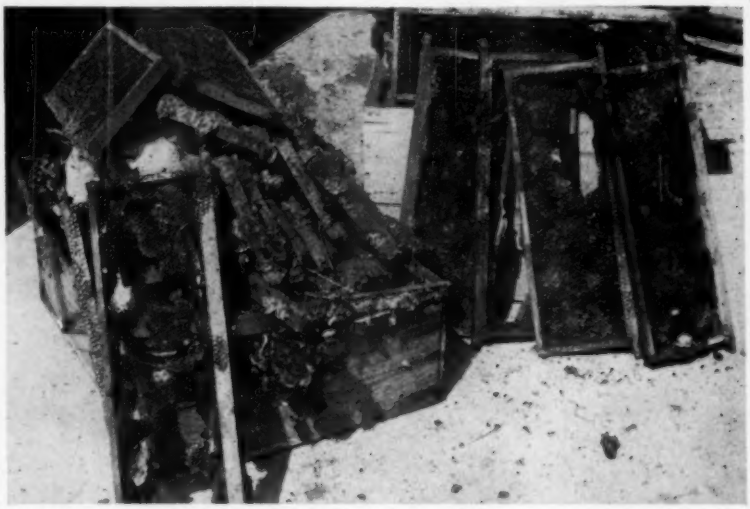

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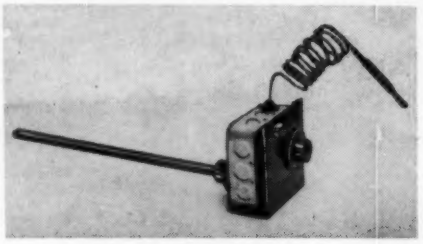

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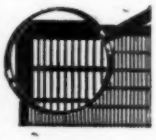

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The
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Science and the Honey Bee

BEEKEEPING RESEARCH: Past, Present, Future*

by Walter C. Rothenbuhler
Iowa State University
Ames, Iowa

Dr. Rothenbuhler is in charge of apicultural research at Iowa State University, Ames, Iowa. He is also Science Editor of the American Bee Journal. One of his chief interests is the genetical study of inheritance factors in honey bees.

Some beekeepers think that research on bees is a sort of harmless play-work engaged in by college professors. They have not been alone in holding this sort of idea because most farmers, businessmen, tradesmen, and American people in general have felt the same way about research on any topic—it takes forever to get answers to questions many of which have no practical importance. Beginning in the 1930's, a change has been creeping over us. The coming of hybrid corn, sulfa drugs, penicillin, and even nylons has made us aware that what scientists do may result in something worthwhile. Furthermore, we are aware that the Russians have heavier satellites out in space than we have and even though we cannot see what earthly use a space satellite can have, we have a feeling that our government ought to hire more rocket experts and build more laboratories. Where such experts are to come from, and whether they will be good or poor researchers, we forget to consider. By this time, nevertheless, we believe in research when it is directed toward the solution of specific problems like launching bigger satellites, preventing polio, or curing cancer—in other words applied research.

Still it remains difficult to see how *basic research* is of any value. Basic researchers are experimental investigations aimed solely at better understanding of natural processes or phenomena. Basic research has no specific or immediate economic goal. It is not aimed at more gain per pound of feed, more production per acre, or more pounds per colony. It is aimed at a more nearly complete knowledge. Almost without exception, in the past, a better knowledge of chemical or biological, or physical processes has been used to increase production, or cure disease, or contribute to human pleasure. Applied research is only one step removed from practical application, basic research is two steps removed, and most of us cannot see the second step. Perhaps a look at beekeeping history will bolster our faith in the fact that the second step is there.

Development of Beekeeping Knowledge

When you divide a strong colony in the spring to make two colonies, and introduce a young, commercially reared queen to the new colony, how much knowledge gained through research are you using, perhaps unconsciously? When were the various bits of knowledge gained? There is not enough space to trace the details, but a quick look at a few high points is most interesting.

If one wanted to increase the number of his bee colonies 2000 years ago, the ancient authorities had written a most extraordinary way of doing so. Very briefly the method was to kill an ox inside a building, and place the dead animal on a good quantity of thyme (a kind of plant), after which the building was to be closed. The building was open for a time during the third week, again closed, and again opened after 11 days. From Florentinus, according to Fraser (1931), comes the following: "Having then opened it on the eleventh day after this period, you

*Journal Paper No. J-3974 of the Iowa Agricultural and Home Economics Experiment Station, Ames, Iowa. Project No. 1332.

will find it full of bees crowded in clusters on each other, and the horns and the bones and the hair and nothing else of the bullock left. They say indeed that the kings are produced from the brain but the other bees from the flesh. Kings are also produced from the spinal marrow. But those that are produced from the brain are superior to the others in size and beauty and in strength." Then there follows a description of how the bees are attracted to the light at the windows and directions are given for opening the windows periodically and attracting the bees to the apiary by the use of the fragrance of flowers.

It would be a great mistake to think that people did not believe in this method. For hundreds of years it was accepted. If it seems ridiculous to you, it is because of your superior biological knowledge. It was repeated for the last time as a serious statement in 1842 by W. C. Cotton in *My Bee Book* when it was stated that Mr. Carew had successfully performed the miracle in Cornwall (Fraser, 1931).* Fraser remarks, "The superstition survived, because the theory of spontaneous generation was generally held until the nineteenth century, and because the life-history of the bee was not accurately known until Huber's discovery at the end of the eighteenth century." According to the science historian, Singer (1959), about the middle of the 1800's adequate evidence was produced for three of the widest biological generalizations: "Every cell from a cell" (Virchow); "Every living thing from an egg" (Modified slightly from Harvey who presented it earlier without much evidence); and "Every living thing from a living thing" (Pasteur). Preceding these statements and giving rise to them were discoveries in embryology, cytology, taxonomy, and microbiology. The nonsense of oxen-born bees could no longer endure. Fraser says further, "It is a strange fact that all the ancient writers on beekeeping, with the exception of Aristotle, make mention of this story of the generation of bees from oxen."

In the history of science as well as the history of beekeeping, Aristotle (384-322 B.C.) occupies an outstanding place. He observed living things and natural processes as carefully as he could many centuries before microscopes were invented. He knew that insects have a head, thorax, and abdomen. The only sense organs that he could see were the eyes, but he believed correctly that insects could smell and taste as well as see. He went on to consider the bee, a particular insect, which resembled and differed from others in certain ways. Aristotle observed the larvae in feeding and growth until the adults emerged. He did not know, however, how long it takes for the growth of a bee from egg to adult. This may have been because the comb removed for observation, having been cut loose from its support, could not be returned to the hive for further development of the brood.

Aristotle knew that there were workers, rulers (queens), and drones in the hive. Workers had stings, drones had no stings, but rulers had stings which were not used. He thought incorrectly that there were always more than one ruler per hive. Apparently he did not know the sex of the rulers, (calling them kings but mentioning that some called them mother bees) but he did realize that rulers had some connection with the production of brood. Fraser (1931) sums it up by saying that, "Aristotle knew that rulers, workers and drones were produced when rulers were present, and drones only when they were absent. By the help of pure logic he tries to deduce the facts of the generation of the bee. His conclusion is that rulers generate rulers and workers, workers generate drones, and drones do not reproduce." This is a marvelous *approach* to the truth, but more research was required (in addition to correct logic) before the actual facts could be known.

Here one might ask the question: What increase was there in knowledge of bees from Aristotle, in the 4th century before Christ, until 1600? The answer is: very little. Bees were kept, and honey and wax produced through all the centuries, but research on bees was almost at a standstill. If one wanted to learn "the facts," he read an ancient "authority" like the Roman country gentleman, Varro (116-27 B.C.); or Virgil, poet and beekeeper who lived shortly after Varro; or Pliny (23-79 A.D.), Roman naturalist and philosopher. None of these men was the scientific equal of Aristotle whose writings on biology did not attract enough attention (perhaps they were ahead of their time) to require the making of many hand-copied duplications. Of course, no books as we know them were available until after printing, with cast, movable type, was invented by the German, Gutenberg, in 1447.

One of the most famous books, even though not the first one on bees in the English language, was Butler's *Feminine Monarchie*, the first edition of which appeared in 1609. A good account of Butler's ideas on bee biology is given by Barthel in this issue of the *American Bee Journal*. This account is followed by a discussion of the level of knowledge in three other books published over the next 120 years.

To increase the number of colonies by dividing parent colonies, neither knowledge nor equipment were adequate in the 1600's. Great advances were made in the next 300 years. The question of the sex of bees was nearly settled by the Dutch entomologist Swammerdam in 1673. By the most skillfull and painstaking dissections he learned beyond doubt that queens are female and drones are male, but workers he called neuter. It remained for Huber to demonstrate, about the beginning of the 1800's, that workers are also female.

Schirach in Germany discovered about 1761 that an egg in a worker cell could become a queen. As stated by Pellett (1938), "This discovery laid the foundation for the investigations and experiments which were one day to develop a system of management permitting the rearing of queen bees in large numbers." With these later methods the names of Alley and Doolittle are associated in the late 1800's. Even though Swammerdam established the sex of queens and drones, the fertilization of bee eggs was a wide open question until more than 100 years later. Various explanations were offered, but Huber (1814) settled the matter about 1789 by proving that queens mate with drones outside the hive. Presence or absence of drones in a divided colony would now be disregarded, but not so when it was thought that the odor of the drones was the fertilizing agent.

Naturally, a present-day beekeeper would not want to divide a colony with American foulbrood; dividing a colony with a minor infection of Sacbrood might be done. In 342 B.C. Aristotle wrote, "There is another disease, which is like a wildness in the bees, and causes a strong smell in the hives. The bees should be fed on thyme, the white sort is better than the red." Not until the last of the 1800's and the 1900's was any better recognition of bee diseases made, and

(Please turn the page)

*It is probable that one or more of several species of flies fed and grew in the carcass of the ox.

not much better treatments were used. Understanding of bee diseases had to await the invention of the microscope about the beginning of the 1600's and its improvement over the next 250 years. Study of bee diseases was facilitated by discoveries that microorganisms could cause disease (Bassi, 1835), by Pasteur's work on silkworm diseases (1862), and by Koch's bacterial staining and cultivation techniques (1877 and 1881).

Dividing a colony of bees, as in modern beekeeping, would be nearly impossible without modern equipment such as the movable frame hive and foundation. Here were a pair of inventions the value of which was tremendous. It seems almost incredible that it took so long to arrive at the movable frame hive. A great need for it was felt by both beekeepers and scientists for three centuries before it came (Fraser, 1931) in 1851 through Rev. Lorenzo Lorraine Langstroth. Wax foundation came in the 1840's and 50's, the account of which is given by Pellett (1938). By now the bee colony was truly accessible to investigation.

From the dawn of agriculture, with its associated plant and animal breeding, until 1866, no one understood how offspring derive characteristics from their ancestors. In 1866 Gregor Mendel published the results of one of the clearest, most precise biological experiments ever done. It had to do with heredity in peas. Mendel may have gotten the idea for his experiments from Dzierzon's work on parthenogenesis in bees done in 1845 (Zirkle, 1951). Mendel's results and their interpretation received not the slightest attention until 1900, when several other investigators obtained evidence of the same type of heredity discovered by Mendel, and in their search of the literature found Mendel's paper. The science of heredity dates from 1900.

In addition to peas, Mendel did experiments on heredity in bees. His results are not known. Perhaps lack of a way to control mating in bees, or the occurrence of multiple matings of queens which was not known to occur at the time, led to results that Mendel in his genius recognized as uninterpretable. The search for a means to control mating of queens and drones was carried on for years (reviewed by: Watson, 1927; Pellett, 1938). Success was finally achieved when Watson designed the basic technique of artificial insemination of queen honey bees (Cale, G. H. Sr., 1960). By the mid 1940's, the contributions to an improved technique, principally by Nolan, Laidlaw, Mackensen, and Roberts made artificial insemination in bees a thoroughly usable procedure for genetic and breeding research.

Great Steps to the Present

Science has been called "trained and organized common sense." As such its origins are in the remote past, for people must always have tried to deal with their surroundings in a systematic and practical way. Certainly the origins of our science go back as far as Mesopotamia and Egypt—1600 to 1800 B.C. These people were interested primarily in practical questions only—"the use of it." The Greeks by contrast (500 B.C. and later) wanted to know for the sake of knowing. Aristotle, the father of bee research, lived in Greece. Aristotle compiled what others knew, and more importantly, made extensive observations of his own, recorded them, and reasoned about what he had seen.

The Romans, who came next, were interested like the more primitive peoples in things that they could see were useful and they produced almost no scientific advances. Instead they established the age of authority. If some great man of the past had asserted something as a fact, Romans, and all other peoples for the next 1000 or more years, were willing to accept it as fact without test or evaluation. Not until the 1500's was authority dealt its death blows and science progressed from that time forward.

The ready availability of books and printed materials following the invention of movable type gave science and all forms of creative endeavor a push forward. By the beginning of the 1500's, printing was a well developed art and books were soon to be printed in large numbers, and made generally available because of their cheaper prices. It is impossible to overestimate the importance of printing to the spread and increase of all kinds of knowledge including that of beekeeping.

The increased speed in the development of experimental methods, beginning in the 1500's, brought about rapid progress in science the end of which is nowhere in sight. Some of the main features of the experimental method are the choice of a limited problem which can be investigated, like *one* bee disease, or *one* kind of behavior, or the heredity of *one* characteristic; secondly, the explanation of the experimental results one obtains; and finally, the test of the explanation by a new and different experiment. The necessity of experimental controls has been recognized and their use has become general only perhaps in the last 100 years. Today no experimentalist would treat diseased colonies with a drug without leaving some diseased colonies untreated. The treated and untreated are then compared to learn whether the treatment had any effect. Without such untreated control colonies one cannot certainly ascribe recovery to the action of the drug administered.

In the area of interpretation of results the procedures of modern statistics, developed largely during the past 30 or 40 years, are essential. Statistical analysis enables an experimentalist to decide whether the differences he observed between his treated and untreated colonies, or between two pound and three pound packages, or between two different strains of bees, were real differences or just fluctuations due to chance like 7 heads and 3 tails in 10 tosses of a penny.

What May Be Expected in the Future?

Common sense dictates that the first paragraph of a section such as this should infuse the whole with caution. All that one can do is make more or less informed guesses which may turn out to have been more or less correct.

For the purposes of this section, beekeeping may be viewed from the standpoint of the hobbyist, of the commercial honey and wax producer, of the commercial pollinator, or of the producer of package bees and queens. In each case, one may consider beekeeping equipment, the bee itself, or the handling and sale of the product of the bee. As has been shown by previous issues of the current historical volume of the *American Bee Journal*, tremendous advances have been made equipment-wise in the last century; some advances have been made in handling and marketing honey; but only a start has been made in the area of improving the bee (Cale, G. H., Jr., 1960). Some advances will be made yet in equipment. It is hoped that substantial advances will be made in handling, marketing and utilization of honey. But it is predicted with great confidence that tremendous changes in honey bees will be forthcoming in the next 50 years, if the fields of honey-bee genetics and breeding are pursued. As Dr. Lloyd R. Watson envisioned (1933), there will be a *new bee*. This new bee may necessitate the development of new equipment

and may even lead to the disappearance of the marketing problem (as will be discussed).

HOBBYISTS—The world is experiencing a population explosion and a mechanization of all industries at the same time. This is resulting in large numbers of people having vast amounts of leisure time. Hobby beekeeping with its opportunities for learning, for working with infinitely variable living animals, and for minor production of something useful, fills a basic need felt by some people. Hobby beekeeping could increase greatly if its rough edges could be smoothed off.

Probably the greatest deterrent is the bee's stinging behavior—stinging of the beekeeper as well as the neighbors. at Ames, we have one line of bees that stung us almost 150 times in about 100 colony visits. We have another line that stung us once in about 100 colony visits on the same days. The hobbyist can be given bees that behave like the latter ones. Efficient development of such bees requires the geneticist to learn the genetic basis of gentle behavior and the bee breeder to make use of this information to incorporate gentleness into otherwise desirable strains.

POLLINATORS—It seems that commercial pollination service can be made more and more dependable and consequently more desired by farmers and seed producers. As has been pointed out previously (Rothenbuhler, Gowen, and Park; 1953) there are bees that fly at cooler temperatures, there are bees that gather more pollen, and there may even be bees that prefer to gather pollen from certain plants. Unless the demand for pollinating services should decline—an unimaginable development—a special bee for pollinating alfalfa, red clover, fruit trees, etc. seems likely.

HONEY PRODUCERS—At the present time, honey production constitutes the backbone of the beekeeping industry. Good beekeeping for honey production currently requires a visit to each colony about every ten days to carry out swarm control measures, disease inspections, careful bottom supering, etc. Hours of labor put into each colony unit are rather great, but no other course is possible with the present strains of bees. What can be done about it?

Swarming in bees ought to be reduced to the near zero point, as broodiness in White Leghorns has been reduced. All bees ought to be highly resistant to AFB, EFB, Sacbrood, Nosema and Acarine Disease. It ought to be possible to stack four or more supers on a colony at the beginning of the honeyflow and take them off at the end, filled to the extent possible from the flow. It ought to be possible to order bees that store twice as much honey as those currently available. Is it possible that colonies of bees having the above characteristics would be adequately cared for by three colony visits per year? With the labor and other cost reductions made possible by such bees, what would happen to production costs? With production costs literally slashed, is it not likely that honey would capture 2 to 10 percent of the sugar market and bring a new state of health to beekeeping? I am just asking the questions.

PACKAGE BEE AND QUEEN PRODUCERS—The main task of this segment of the industry is to supply the bees that the hobbyist, the pollinator, and the honey producer want. To do this the commercial queen rearer may want closer communication with both public and private experimental work. He may obtain highly developed breeding stock from some source to which he has access, or if his own resources are sufficiently extensive, he may develop his own stock.

A picture of the future package bee and queen industry may be drawn possibly from the present hybrid seed corn industry. The experimental breeding work is done by large commercial organizations and some experiment stations. Many other experiment stations are more involved in basic genetic and breeding research. Much of the actual seed is grown by seed producing farmers who sell it to corn growing farmers. A few plans more or less like this are already in operation in the bee industry.

HOW MAY IT HAPPEN?—Briefly stated, it seems likely to happen by a continuation and expansion of interests already held and investigations already underway. Physiology in the honey bee will be investigated for its contributions to insect physiology and for its contributions to beekeeping problems, one of which is queen rearing. Bee morphology will be investigated for its own sake and because morphology is basic to almost all other areas. Honey-bee pathology will be investigated because there are strains of bees resistant to American foulbrood. This is thus far the only proven case of such resistance to disease in an insect. Bee genetics will be investigated because here is an economic animal of unusual cytological and biological interest. Breeding experiments will be carried on because they are one of the steps to a better bee and because the bee may be a uniquely valuable animal for testing certain hypotheses in population and quantitative genetics. Behavior in honey bees will be investigated because very few other insects or animals have evolved such extensive behavior patterns.

It is becoming increasingly clear that behavior characteristics are economically important in bees. It is even probable that no other class of characteristics is of equal importance for the attention of bee breeders. Nectar and pollen gathering, swarming and brood rearing, stinging, comb building, propolis deposition, burr comb construction, guarding against robbers—all are behavior characteristics. Most beekeepers have seen colony differences in these characteristics. Since such differences exist, the geneticist desires to know whether they are produced by heredity. We have excellent evidence at Iowa State University that some differences in behavior are genetic in origin. This being the case, they may be increased or decreased in strains of bees. Studies on genetics of behavior in bees are expected to be of substantial importance to the science of biology and of great practical value to beekeeping perhaps within the next 20 years.

Realization of the latter prediction depends on a two-step process. The behaviorist and geneticist must study thoroughly the various patterns of behavior in bees, must study the differences in behavior patterns, and must learn the gentic basis for each one. Such is the first step—basic research, or pure science, so-called. The second step, applied research, or applied science, requires the bee breeder to note what the behaviorist and geneticist have learned: How many genes determine each characteristic? Are the genes dominant, recessive, or intermediate in their expression? What mating system of queens and drones will be most effective in establishing each desired characteristic? With such a road map, the bee breeder can engage in scientific breeding which will result in his desired goal—a better bee. Bee genetics projects may result in completely unforeseen and revolutionary discoveries and in any case tend to assure the success of subsequent bee breeding projects.

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Literature Cited or Reviewed

Cale, G. H. Jr. 1960. The rise to better bees. American Bee Journal 100:174-175.

Cale, G. H. Sr. 1960. Lloyd Raymond Watson: Father of controlled mating. American Bee Journal 100:180-181.

Fraser, H. Malcolm. 1931. Beekeeping in Antiquity. 157 pp. University of London Press. England.

Fraser, H. Malcolm. 1955 - 1957. Eight papers tracing: Beekeeping in the British Isles from before 1500 to 1900. Bee World. From No. 10 of Volume 36 to No. 7 of Volume 38.

Huber, Francis. 1814. New Observations Upon Bees. Translated by C. P. Dadant 1926. American Bee Journal, Hamilton, Illinois.

Locy, William A. 1925. The Story of Biology. 495 pp. Garden City Publishing Company, Garden City, New York.

Pellett, Frank C. 1938. History of American Beekeeping. 213 pp. Collegiate Press, Inc. Ames, Iowa.

Rothenbuhler, Walter C., John W. Gowen, and O. W. Park. 1953. Recent work in honey-bee genetics with preliminary consideration on the breeding of honey bees for pollination. Proceedings 8th. Annual Meeting, North Central States Branch, Entomological Society of America, pp. 45-56.

Rothenbuhler, Walter C. 1958. Genetics and breeding of the honey bee. Annual Review of Entomology 3:161-180.

Rothenbuhler, Wlater C. 1960. A technique for studying genetics of colony behavior in honey bees. American Bee Journal 100:176, 198.

Singer, Charles. 1959. A Short History of Scientific Ideas to 1900. 525 pp. Oxford University Press. England.

Watson, Lloyd R. 1927a. Controlled Mating of Queen Bees. 50 pp. American Bee Journal, Hamilton, Illinois.

Watson, Lloyd R. 1927b. Controlled mating of honeybees. American Bee Journal 67:Part I, 235-236; Part II, 300-302; Part III, 364-365.

Watson, Lloyd R. 1933. As I see the new bee. American Bee Journal 73:91-92.

Zirkle, Conway. 1951. Gregor Mendel and his precursors. Isis 42:97-104.

Early Development of Bee Biology

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Today it is an accepted fact in the realm of apiculture that a colony of honey bees includes three types of individuals: workers, the infertile females which make up by far the largest share of the colony; a few drones or males; and a single queen, the only fertile, egg-laying female in the colony. It is also known that the workers do the food-gathering, housecleaning, brood rearing, and other tasks necessary to the maintenance of the colony, that the drones serve no function other than to mate with the virgin queens, and that the queen lays all the eggs from which develop new individuals to maintain or increase the population of the colony. The fertilized eggs which she lays develop into workers or young queens, depending upon the food given to the young larvae which hatch out of them and the type of cell in which these larvae are raised, and the unfertilized ones become drones. But these things have not always been common knowledge, for although the practice of beekeeping has existed since the beginning of civilization, men did not begin to understand the sex and development of bees until less than two centuries ago.

CHARLES BUTLER: *The Feminine Monarchie*

In 17th and 18th century England such matters were the topic of much debate among the beekeepers and biologists of the day, and a variety of theories were advanced before the present-day one was evolved and finally generally accepted. One of the earliest English writers on the subject of honey bees and apiculture was Charles Butler, who in 1623 published *The Feminine Monarchie*, or *The Historie of Bees*. In this volume, along with much practical information on the techniques of beekeeping, he also includes a discussion "of the breeding of Bees, and the Drone." He begins by stating some of the various beliefs of the day regarding the origin and usefulness of drones in the colony, such ideas as that a drone is a worker that has lost its sting, a theory which he believes is as logical as "that a dwarf having his guts pulled out should become a giant." Also, he discredits the theory of some that drones are an entirely different species from workers, for he has observed that "at the time of their breeding and many months before there is not a drone left alive to breed them."

Mr. Butler then proceeds to advance his own theory that the drones are male bees, giving as evidence such reasons as "that they are suffered in breeding time only," being driven from the hive after that, that if the drones are killed "in breeding time, the Bees breed no more," that wasps and "Dorres" (bumblebees?) also have drones which are known to be males, and finally that the internal anatomy of the drone appears to be that of a male. Concerning this latter reason, he also remarks that such evidence was even noted by Aristotle (about 342 B.C.) but that he did not believe the drones to be male because "Nature hath armed no female for fight and force against the male; but the Bees have power and weapon to chastise the Drones, and therefore the Drones cannot be their males."

Mr. Butler then goes on to tell how the bees lay their "seeds," which are the size of those of the Cabbage butterfly but white in color, in the middle of the bottom of empty cells. This "bee-seed" at first sticks upon one end, but as soon as it "becomes alive" as a worm it "becomes loose, and lyeth in the bottome of the Cell, round like a ring, one end touching the other, till so the bottom can no longer contain it." At this point he says the worm lies along the length of the cell, and when it reaches the size of a bee, it dies, and the top of the cell is covered over with wax. Then, after the worm has undergone a transformation in both shape and color, it begins to live again and, after breaking through the cover of the cell, "cometh forth a Flying Bird."

The "Lady-bees" (young queens) are bred, Mr. Butler claims, in the several "palaces" of the queen, and in a most extraordinary manner: "the golden matter whereof they are made is not turned into a Worme at all, but immediately receiveth the shape of a Bee." He also says that the duties of the queen are exclusively governmental in nature, never mentioning

any connection between her and the origin of the "bee-seeds," and that the drones do help the females in hatching the brood with their great body heat. Thus, as early as 1623 Charles Butler had a fairly adequate idea of the development of the adult bee from an egg, and of the sexes of the various members of the colony, but he had not as yet discovered that the eggs are laid by the queen.

Moses Rusden: *A Futher Discovery of Bees*

About 60 years later, in 1679, Moses Rusden, an apothecary and Bee-Master to the King, published ("by His Majesty's special command") a book entitled *A Further Discovery of Bees*. In this volume, along with general beekeeping instructions, a report on his experiments in keeping bees in transparent boxes rather than the conventional straw hives, and an advertisement for the ready-made box-hives and colonies, instructions and licenses obtainable from the author, he presents a theory of "the generation of bees" quite radically different from those of Mr. Butler and other predecessors. Perhaps the most striking difference is his reference not to a queen but to a "King-Bee," which is "the most absolute Monarch, yet is attended with all the Love and Loyalty imaginable from his people, because he devoureth none, but is a cherisher of and benefactor to all." He affirms most strongly that "the King-Bee is a Male and the only Male in every Colony and Hives of Bees, . . . for it is the property of the Male to eject Sperme, and the King-Bee only hath Sperme and doth eject it." He also describes in detail the "seed" ejected by the "King-Bee," and asserts that it is not an egg but sperm, because it has no skin nor shell.

Rusden says that the workers or "common Honey Bees" are females, for they "supply the place and Office of the Female." He says that the so-called duty of the female of any species is to "prepare the matrix and to administer augmentation to the Sperme so as to bring forth or hatch up." Thus, since the workers are preparing the "matrixes" when they build combs and prepare cells, and since they "administer augmentation to the Sperme by gathering of animable matter and putting it in the matrix" and by keeping the brood at a constant temperature so that it will hatch, they are females. He explains that this above-mentioned "animable matter" is a generative material that the workers collect from certain vegetables (undoubtedly a reference to pollen), deposit in the cells, and then mix with the "Sperme" injected there by the "King-Bee," the manner of mixing depending upon whether it is a worker, a drone, or a new "King-Bee" that is to be generated. In a later chapter he explains this in even greater detail, saying that first the workers place some "generative matter" in each cell, the "King-Bee" injects his "seed," and then the workers fill the cell the rest of the way with the "generative matter," mix it with the sperm (using sufficient water to maintain the proper moisture and consistency), and finally cover the cell over with wax and maintain a constant temperature until the young bee is mature and forces its own way out of its cell. Furthermore, the difference between workers, drones, and the "King-Bee" is due solely to the different kinds of "matrixes" and "generative matter" used for each.

Mr. Rusden believes that the drones are neither male nor female but are mere servants of the workers, produced by nature to take the place of the workers in the hives at the times when workers are few in number. He reasons that the drones cannot be male since he has never been able to find any sperm in them, and neither can they be female since they have no "fangs" with which to gather generative matter and carry out the other duties of a female. Thus the sole purpose of the drone is to remain close to the brood combs and help to hatch the young bees, particularly during the season when the workers are in the field gathering honey. Thus while Mr. Rusden realized that the "King-Bee' was not merely a ruler but played a vital part in the generation of young bees, his other ideas as to the sexes and of the actual processes involved in the development of bees from egg to adult were much less advanced and accurate than those of his predecessor Mr. Butler.

Joseph Warder: *The True Amazons*

In 1720, about a century after Mr. Butler had published his admirable study of honey bees, another book on the same subject was published in England. This volume, entitled *The True Amazons: or, The Monarchy of Bees*, was written by a physician, Joseph Warder, and begins with a lengthy and eloquent dedication of the book to Her Majesty the Queen, in which he compares her royalty and sovereignty to that of the queen bee. Then, when he begins his actual description of the bees and their colonies, he violently attacks the theories of the sex and manner of generation of bees presented by Mr. Rusden, discrediting as "unexperienced whimseys" his ideas that all bees develop from some "animable matter," and that there is a "King-Bee" which is the only male of the colony. He claims that it "was a bold stroke of Mr. Rusden to lay down such an Hypothesis and impose it on the World as a Matter of Fact without giving one rational Argument to prove it or any one Experiment by which he was let into the Secret."

Concerning the generation of bees, Dr. Warder says that the bees begin from white eggs, which are carefully placed in cells near the center of the combs. He then describes how the bees keep the eggs warm until after they hatch and then feed and care for the "maggot" until it reaches the point where it is "as big as a Bee. . .but is no more like a Bee than a Turnip," at which time it is sealed in its cell where it remains until it develops into an adult. Nevertheless, he makes no connection between the "Queen-Bee" and the laying of eggs as Mr. Rusden does with his "King-Bee" and its sperm (the latter undoubtedly actually referring to what we know as the queen and eggs), but considers her to be only the ruler of the colony and having her only duty in governing and maintaining the loyalty of "her subjects" in the colony.

But Dr. Warder considers the drone to be a "poor abused and despised Creature." In fact, he feels that because of "his great industry in the work which Nature has designed him for, in procreation," and in sitting upon and hatching the eggs, he should be referred to not by "that ignominious Name of Drone" but by the more noble title of "the Male Bee." Furthermore, he strongly contests Mr. Rusden's theory of the sex of drones, for he (Warder) asserts that they are males, and goes about proving this by using such arguments as their large size and "loud and dreadful voices," and, most important of all, his observation of male organs in the dissection of the abdomens of drones. Thus the theories of Dr. Warder show little actual advancement, being almost identical to those proposed by Mr. Butler 100 years earlier, but he does quite adequately refute the controversial ideas of Mr. Rusden, and also shows great progress in the detail and accuracy of his anatomical studies of bees.

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JOHN THORLEY: *The Female Monarchy*

Another strongly opinionated writer on the subject of bees and apiculture was the Reverend Mr. John Thorley, who in 1744 published his book on this subject entitled *The Female Monarchy*. This volume includes largely, instructions on the practical aspects of beekeeping as do those books previously discussed, but it also has a rather lengthy and detailed chapter on the "sorts, sex, and manner of breeding of the bees." Mr. Thorley begins with a very complete presentation of the arguments of previous authors, including the three mentioned earlier in this paper as well as some others, and he asks his readers to consider the various theories and evaluate them for themselves, although he does state his own opinions on the various phases of the question. He reaches the conclusion that neither the drones nor the workers are either male or female, and, furthermore, that the drones have "no Instrumentality or Agency in the Generation of Bees" while the workers do erect and prepare the cells and provide food for the immature young.

Mr. Thorley agrees with Mr. Butler and Dr. Warder, though, in claiming that the queen is a female, but unlike these two men, he recognizes the fact that the queen is the sole progenitor of all the bees in the colony, and that she does actually lay eggs (rather than ejecting sperm as claimed by Mr. Rusden), giving as proof for this such evidence as the constant, regular shape and the membranous covering of the egg. The eggs are affixed, he says, to the bottoms of empty cells, and no food matter is placed in the cells for several days until the eggs have hatched, also in direct contradiction to the opinions of Mr. Rusden. Mr. Thorley also includes a lengthy discussion of the food material placed in the cells, finally coming to the conclusion that it is a mixture of the "Matter collected from the Flowers" (pollen) and water, and defending the name of animable or generative matter that Mr. Rusden gives to this substance, for "Nutrition. . .is a Kind of Generation," and thus nutritive materials could be called generative matter.

Continuing with the "generation" process, Mr. Thorley gives a fairly accurate and detailed description of the metamorphosis process, calling it by this name, and mentioning even the gradual pigmentation of the eyes of the pupae. He states that it is disputed whether the insect is actually dead during this period of transformation, and he is of the opinion that it must "actually die and give place to a Successor" since it is divested of its essential parts during this time. Thus it seems that although Mr. Thorley was rather mistaken in his beliefs as to the sex of the workers and drones (he would have done better to put more faith in the reasoning of his predecessors along these lines), he made definite, significant advances in the theories of the "generation" of bees originating with the eggs laid by the queen.

Although the ideas of the four 17th and 18th century authors discussed in this paper are actually only a very small segment of the total process of the development of knowledge of the biology of the honey bee, and although the theories presented by the last of these authors were still far from what is known to be true today, they give a typical picture of the manner in which this knowledge was obtained and developed. In fact, the developmental process evident in this case could be considered to be typical of that in almost any field of knowledge: hypotheses are presented, attacked, supported, and finally confirmed or condemned through experimentation as technology improves and general knowledge increases.

References

Butler, Charles, *The Feminine Monarchie: or The Historie of Bees*, John Haviland, London, 1623.

Rusden, Moses, *A Further Discovery of Bees*, London, 1679.

Thorley, John, *The Female Monarchy*, London, 1744.

Warder, Joseph, *The True Amazons: or The Monarchy of Bees*, London, 1720.

— Current Items —

Honey Imports and Exports

Through the years the beekeeping industry has not been too much concerned with the imports of honey into the United States partly because our exports exceeded the imports and partly because the demand of European countries for other country surpluses has been quite good. A further distinction was that most exportable surpluses were of amber grades.

May the trend be turning since both Mexico and Argentine, the two big exporters of honey into the United States, are now producing honey which may well compare with our own white grades?

March figures indicate that total imports of honey for that month were 425 thousand pounds with exports of 611 thousand pounds. But the April figures indicate imports of honey were 826 thousand pounds while exports had dropped to 316 thousand pounds. Of course part of this can be traced to the fact that the U.S. carryover of honey from the previous year is near an all time low. Will the import tendency be extended into the new crop year, and may it not have some effect on our own domestic prices, particularly in the amber grades?

Airline Uses Honey Bee Approach

Wall Street Jounal in its July 20 issue contains a full page advertisement of American Airlines—blank except for a dotted line reaching a honey bee on the lower part of the page.

Accompanying is the statement "Apis melifera," the honey bee is the only carrier to fly more miles than American Airlines in June. Over 620,000 miles logged—. Moral—There's only one queenbee in any hive—the one swarming with happy customers."

Pretty good plug for the honey bee.

Insecticides in Idaho

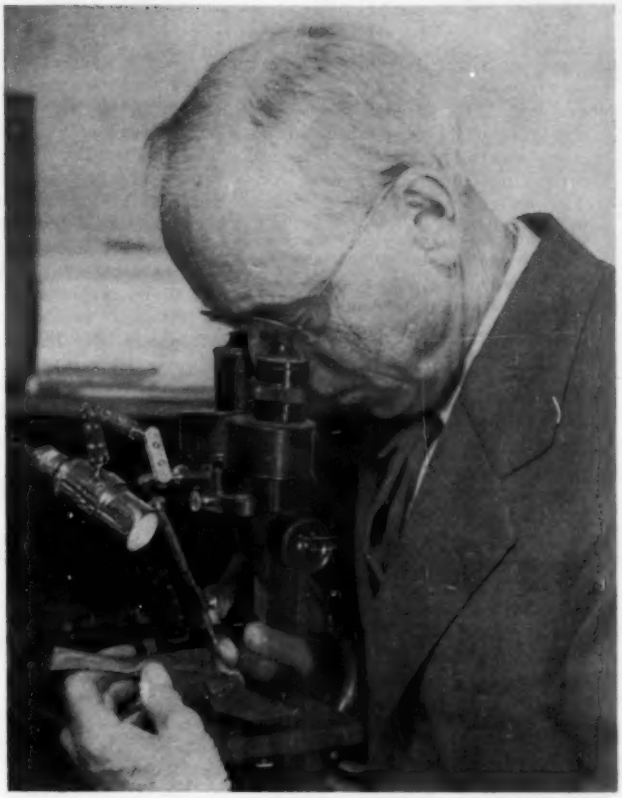
Incorrect application of insecticides or the use of wrong insecticides has resulted in heavy losses among bees in this area. C. D. Bechtolt, Canyon County agent, reports heavy damage to area pollinators, "In some places you can pick up handfuls of bees dead in front of their hives," he said. Several producers have suffered almost total losses, others have reported damage which is more than casual.

According to Bechtolt the tragic thing is that not only some of the bees suffer but the whole area suffers because of the loss of crop pollination. Of course seed growers need to use some insecticides but the loss of bees would be at a minimum if farmers used the right insecticides at the right time.

by Robert Ellefsen
Salt Lake City

ARE WE READY FOR A NEW BEE?

by Dr. Lloyd R. Watson



Raymond Lloyd Watson developed the instruments for the insemination of queen bees and contributed much to the technique of their use. He is one of the "greats" in apicultural science. He wrote this article in February 1936 for the American Bee Journal.

The little wild honeybee which we have was the identical bee of our fathers; it was also the bee of their fathers, and again of theirs, and so on back to historical oblivion till the writings of Virgil seem modern in comparison. In reading almost any agricultural treatise of our day nothing is more evident than the fact that plants and animals as they are found in their wild condition do not fulfill the exacting needs of man's scheme of things. He, therefore, sets himself to the task of developing from these wild forms organisms which will fulfill his needs. By outbreeding and inbreeding and selection he builds almost any type of plant or of animal that he wants. For example, in various parts of Europe and Asia there could be obtained from their respective natural habitat specimens of wild horses of the forest type, the plateau type, the steppe type, and the Indian Siwalik type, all possessing great hereditary diversity.

Students of antiquity tell us that the modern horse has through a long period of years resulted from the intermingling of several wild species which were probably connected with the tree-toed horse of geologic times.

These skittish little progenitors of the common horse differ greatly in form, color, size and habits, and when early man began to domesticate them they were found to be markedly interfertile. There was no scarcity of wild strains from which to select specimens for breeding in any desired direction. Their striking physiological diversity and the ease with which they could be hybridized, producing fertile offspring, afforded ideal conditions for the regrouping of characters to produce new types of horses. It seems certain that our modern horses possess practically no characters which were not to be found to some extent in those primitive equine ancestors.

The evolution of the horse from small, wild ancestors, for the most part of little or no economic value, up through gradual steps to a creation of tremendous economic importance and of beauty is but one illustration drawn at random from many similar phenomena. The modern poultry house, the modern sheep ranch, the modern dairy barn does not contain the products of wild nature. The little wild jungle fowl had to be rebuilt to meet the exacting needs of man. Her size, the texture of her flesh, and her timidity had to be altered. Her natural output of 20 small eggs a year truly was a beginning but it was only a beginning toward the 300 large eggs she now produces. The modern egg-hen is not a product of nature alone. If left to nature alone she would never have existed. But what nature alone could not do, man, by dint of sympathetic study and long, intelligent effort has assayed to direct the forces of nature to the noble end that he has become if not the creator then at least the co-creator of a beautiful new thing.

The application of the principles of biology to the development of domestic forms has led to the irresistible conclusion that every animal and every plant which we know is the result of the interaction of two factors, viz., the hereditary make-up of the organism and the conditions under which it has developed. There are, therefore, two avenues of approach to the problem of the improvement of a domestic animal or plant, (1) the selection of such parents as will produce superior offspring, and (2) the providing of such conditions of food and shelter (environment) as will favor the best development of the culture.

It is too obvious that down through the years to the present time the science of beekeeping has addressed itself almost wholly to considerations which fall within the second category, viz., environment.

To discover how effectively the control of environment has been employed for the betterment of beekeep-

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ing one needs only to compare a text book of today with one of 50 or 75 years ago. The endless discussions about types of hives, methods of increase, swarm control, wintering, supering, queening, and disease control all belong essentially in the category of environment.

Notable among the industrially important inventions which have been added to beekeeping in comparatively recent times are the movable-frame hive, the honey extractor, and machine made comb foundation. These are contributions from the engineer and together with modern methods of artificial queen-rearing, they enable the industry to take advantage of the wonderful fecundity of the bee. They enable man to get more out of the bee, but without altering in the least her hereditary qualities. It may fairly be said, and it must be said, that the utmost has been made of the bees, such as we have, but the genetical potentialities of *Apis melifica* now after 3,000 years of continuous history are as a closed book.

The long static condition of beekeeping as regards the evolution of new types of honey bees is a predicament in which no enterprising person can take pride. So long has this situation existed in spite of all attempts to relieve it that a certain dangerous attitude of reconciliation to the woeful deficiencies of the little wild bee has become all but universal.

The cause of this dilemma is not far to seek. Certain obstinate differences of a specific nature distinguish the bee from all other form animals. Two of these differences are outstanding—(1) the habit of the queen of mating on the wing precludes the possibility of our selecting her mate, and (2) the diminutive size of bees prevents us from seeing them as individuals. We generally see them not as individuals but in mass. More than other types of farm animals, bees are noncommunicative. They are cold blooded, too, which peculiarity sets them apart from other animals which we culture. Since we ourselves are warm blooded and possess about the same type of nutritive system as most of our domesticated animals we have a natural sympathy toward our animals when they suffer from hunger or thirst or cold, but such sympathy for bees is not so spontaneous nor so intelligent. On account of the construction of the hive, and the dominant preference of honeybees of living in the dark, much of their family life is hidden from our eyes. Furthermore, many of the habitual functions of bees are executed with flashing speed and obscured by their dense clustering so that at best they can be observed only by little starts. In breeding for the development of certain desirable qualities in our larger animals it is sometimes of considerable assistance when those desirable qualities are known to be associated with external characters, easy to follow and capable of measurement. It is difficult to find such external characters for bees, due partly to their small size and partly to our unfamiliarity with even the exterior peculiarities of our cultures.

It is perfectly obvious that the greatest need of the beekeeping industry of every country at this time is better bred stock. The honeybee in her present native condition is woefully inadequate to fulfill many of the functions which twentieth century agriculture would fain expect of her. Let us illustrate by an analogy which we again find in the horse world. The diversity of uses to which the horse is put requires that there be types or variety of horses adapted to specific needs. Thus the agricultural market can supply among others, carriage horses, heavy draft horses, medium draft horses, race horses, and saddle horses, each type having been developed through numerous generations to serve its own specific purpose.

Never has the beekeeping profession possessed any such wealth of types of bees specially designed and bred for specific uses. In northern climates we need bees able to resist low temperatures while in tropical and semitropical climates this quality in bees would have no particular value. It is a matter of common observation that our bees do not work well when the temperature is less than sixty degrees and they refuse generally to fly when the temperature settles below fifty degrees. Different stocks do show some variation in willingness to work at low temperatures but these figures represent a fair general statement. It may be appropriate here to mention that C. R. Kellogg, a missionary beekeeper of Foochow, China, tells me that the Chinese bee not only withstands temperatures of fifty degrees with impunity but gathers pollen and water freely at forty degrees.

In the large apple orchards of the Lake Champlain region of New York State there is annually a great demand for bees during the short period of bloom to pollinate the self-sterile varieties. Beekeepers of the neighboring country are hired by the orchardists to bring in their colonies of bees and place them at regular intervals through the orchards. Immense losses in crops have sometimes occurred in spite of these precautions because the temperature hardly rose above fifty degrees during the entire week in which the apples were in bloom. A honeybee bred specially to fly at low temperatures is needed for such a situation as this.

According to records made in my laboratory in Alfred, New York, on numerous samples of bees collected from various apiaries in the East the average tongue-length was found to be about 6.25 mm. This length of tongue enables our bees to gather nectar from many important flowers including white (Dutch) clover, alfalfa, sweet clover and buckwheat, but it is entirely too short to reach the nectaries at the base of the corolla tubes of one of our most important agricultural forage plants, viz., red clover, which therefore must rely for pollination upon the visits of a few moths and bumblebees whose tongues are long enough. When bumblebees are numerous, red clover sets a good crop of seed, but in the absence of bumblebees this important plant remains sterile and seedless. It is of interest here to note that when red clover bloom is dwarfed by a severe drought honeybees are sometimes able to span the shortened corolla tube in which case they may store a crop of the most elite honey, but still more important to the agronomist, the plants set a normal harvest of seeds. Now length of tongue is a hereditary character. Daughters of long-tongued parents tend to possess long tongues. Agronomists from those regions where red clover grows well are asking for bees specially bred to pollinate their bloom. In the early days of controlled mating of queenbees, a professor in the Cornell agronomy department proposed that while I seek to develop a longer tongued bee he would seek to develop a shorter corolla red clover in the hope that somewhere, sometime we would meet.

The idea of a longer tongued bee has captured the imagination of progressive beekeepers for many years, especially beekeepers of red clover growing regions.

Every plant and every animal possesses its own individuality. There cannot be found two trees, two animals, two leaves, two cells, that are exactly alike in every respect. Sometimes two organisms may appear to be identical, but this is because scru-

tiny has not been thorough enough, and even so-called identical twins will be found to differ in some details. We distinguish between our friends, or pets, the members of our herds and between trees by means of their differences. If there were no variation there could be no identification. Just so, the basis for selection within the limits of the race is the heterogeneity of the population from the point of view of the qualities to be selected. "It becomes evident then that variation is at once the hope and the despair of the breeder." It is the hope because without variation there can be no selection toward the better, and it is the despair because frequently after improved strains have been set up, the operation of variation tends to tear them down again. We find an example in the sugar beet where a high percentage of sugar has been built up by continually testing and selecting the "mother" beets from the next crop of seeds.

Breeding may be defined as "th art of improving plants and animals by hybridization and selection." We have cows, for example, which far surpass in yield of milk their ancestors, sheep with the finest wool for the manufacture of cloth, and sheep which produce a less quantity of wool but a corresponding greater yield of meat for the butcher. Aside from these types, bred for purely economical purposes, there have been produced by man races whose usefulness is very small, but which on account of their abnormality or their beauty find fanciers. These are the so-called fancy breeds such as bantams, Houdans, Frizzles, dwarf dogs, peafowl, and pigeons.

The world is ever changing and a movement toward ultimate equilibrium is everywhere seen. At the risk of stating a truth already self-evident it may be said that all plants and animals exist on the earth because their environment lets them live, which is to say because they are able to accommodate to their environment. It is a fact not without significance that amid the equilibrium seeking changes of unknown ages the honeybee has undergone no noticeable or remarkable changes. Where can we find more convincing evidence that the honey bee is in perfect adjustment with nature in its present form. She is perfect, indeed, from the view point of nature. The honeybee pollinates bloom, much bloom, and nature asks nothing more of her. So was the progenitor of the modern cow perfect from the viewpoint of nature. The little wild forbears of cows bore their young in the spring, suckled them for a few days and then became nonproductive till the next season. Nothing further was asked of them. They fulfilled the purpose of their existence.

But nature's cow, nature's best throw for a cow, fell far short of satisfying the economic requirements of man; so man was forced to refashion nature's cow to fit his needs. Nature's cow was totally inadequate for the purposes of man; so also, man's cow would be equally inadequate for her own protection and subsistence if suddenly abandoned to shift for herself. Many of the extremes that man has bred could not survive, and are dependent upon him for an artificial environment. It seems probable that our most highly bred milch cows with their heavy udders would in the wild state soon fall prey to bears and wolves. A brisk sprint of fifty rods in the hot sun might kill a prize butterfat cow. But man wants the butterfat and he is quite willing to supply to the cow artificial protection from excitement, danger, and from excessive fatigue so that she can produce it.

In exactly similar manner the wild honeybee, our common bee, is entirely satisfactory for nature; she is perfect, but when man's conveniences are consulted the picture changes color. The wild bee does not satisfy his requirements, far from it, and so there is happening with the bee precisely what has happened with every other farm animal—he is confronted with the task of designing and building a modification that will satisfy his purposes.

The fact seems wholly unassailable that through selection and breeding man can substantially change about any hereditary quality that an animal may possess, and so remodel it to suit his needs or his fancies. Thus Darwin once said: "State a quality which you desire and I will breed it in the animal in question. That certain limits exist in this connection is to be understood."

Schwann discovered that the cell is the basis of all tissue whether animal or vegetable, and that animal cells and vegetable cells are essentially alike. Darwin's studies proved that the laws of breeding of plants and animals are essentially the same. Every breeder of animals and plants recognizes and is guided by this truth. We know that all organisms tend to vary and we know that close breeding along the line of any particular variation tends to increase that variation, and to fix it. Thus Bates, Boothe, the Collens brothers, Bakewell and other early breeders gave us our shorthorns and improved sheep. So also our Hamiltonian horses and marvelously improved breeds of swine were developed in rapid succession. There is now no longer room for doubt that what has been done with our higher vertebrates can be done with insects.

It is a notable fact that to the present time the beekeeping profession has been obliged to go all the way to the bee to study her wild ways the better to accommodate to her every humor. Man has ever been the ardent suitor and the bee has ever been the disinterested coquette. The conscious need of a bee really bred with a definite thought to the conveniences of man and the economic needs of agriculture, is by no means new. The great scientists Huber and Mendel recognized in bees excellent possibilities for breeding experiments, but their efforts met the common embarrassment of all—they could not control the mating of the queen. Had they been able to do so our problem would now be a different story. Only the most versatile imagination can visualize what the effect might have been upon twentieth century agriculture in general, and upon beekeeping in particular. It is interesting to contemplate whether a hundred years of scientifically conducted bee breeding would have given to the beekeeper as many new, useful and beautiful varieties as they have given to the poultryman.

By its intrinsic nature agriculture is forever fettered to the ground, but even so agriculture is a living, growing thing which is ever on the change. The freeman of the soil rears today no longer the same varieties of animals and plants that were his choice a few years ago. Although the little wild honeybee has been standard in all countries for centuries, the time is here when the needs of an ever progressive agriculture testify to the fact that we are ready for a new bee.

Queen Substance?

While checking through some nucs and colonies requeened late last fall, I got a sudden idea. It seems to me when a colony is requeened with a queen of another race, that it immediately takes on the traits of the new queen. Does queen substance do this? I am sure many have noticed this odd behavior.

Raymond Presnell
Banner Elk, N.C.

The Sideline Producer

Advanced Method of Wintering

by A. G. Payne

Wintering bees successfully is simply carrying a colony of bees through the winter in a healthy condition.

A happy colony is essential, namely, a young laying queen, sufficient nurse bees to cover brood etc. and sufficient stores for same (no field bees are needed). The main difference in wintering a large colony or a small one is the amount of stores required.

In the majority of cases all that is required in early spring is the equivalent of a 2 or 3 lb. package, the answer is wintered-over nucs which will develop faster than packages.

The following system of wintering is a radical change from conventional ways, its advantages many, disadvantages nil. This system has met with immeasurable success with those who have adopted it.

After removing the main honey crop it is time to raise young queens so kill or remove old queen. By the time a young queen is laying all the previous queen's, larvae & brood have hatched leaving the frames clean except for honey and pollen, (with the exception of eggs and larvae of new queen).

Place the young queen, eggs, larvae and adhering bees of 2 or 3 frames in a nuc box and gas the parent colony. After burying the dead bees sort frames.

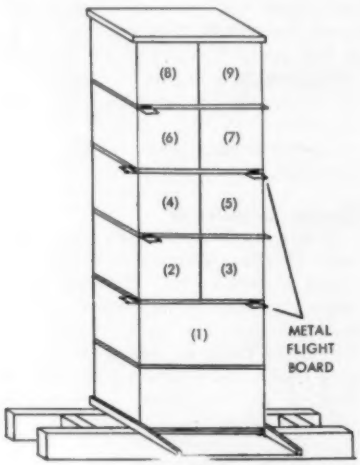


Fig. 1

Winter Stores—

Any uncapped honey in the hive must not be counted as winter stores as brood rearing will continue whilst uncapped honey is present and the bees produced will clean up stores and starve before spring.

To set up for winter the stands must be sheltered from the north.

As many as 9 nucs can be wintered conveniently on one stand. (Fig. I).

Make a super serve a dual purpose by cutting a groove down the center inside of each end (Fig. 2) and slipping a division board in, dividing the super into two equal parts. This makes it a "Duplex." Use 3/16" or ¼" plywood (waterproof), this is removable when using the super normally.

For each "Duplex" make a special floor board (Fig. 3) a strip down the center of an inner cover, 2 openings with screen wire stapled on each side. Openings for bee-ways on the outer edge are cut at necessary locations.

The outlay in preparing these floorboards is small, they last for years and take up little space when not in use.

Each side of "Duplex" is set up the same way, namely, 2 full frames of capped honey next to division board, 2 frames containing queen, larvae, capped brood plus the nurse bees from the nuc box, then one frame of pollen or pollen and honey (Fig. 4).

To build up the stand, use two hive bodies for the lower colony using the most populous nuc for these quarters.

These two hive bodies are made as follows:

When sorting the combs from gassed colonies many will contain partially capped honey or honey and pollen.

These are utilized by arranging them most satisfactorily for the bees.

In one hive body which will be used as the upper of the two, place 2 frames of capped honey at one end, follow through with partially capped honey graduated according to amounts till super is full (Fig. 5).

In the bottom body, starting at the side corresponding to the full combs of honey above, place combs of pollen leaving sufficient room at far end for frames containing nuc.

It is important to place the combs in this manner. The bees will then cluster gradually to the stores which will not be scattered and in early spring when the cluster is broken they will move over to the pollen.

Bees can stand sub-zero weather but not dampness. Do not wrap or pack hives for wintering. Packing retains warmth which is only necessary for brood-rearing. Feeding syrup during winter should be avoided.

Over the openings in the top inner cover, staple a piece of wide mesh screen wire also place an inch piece of wood at the front between the inner & outer cover, the entire stand of nucs then obtains ventilation through every entrance and the top.

Under this system there is no need to go near them all winter, no dead

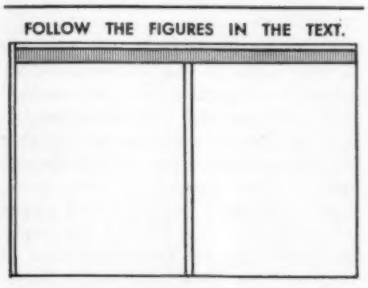


Fig. 2

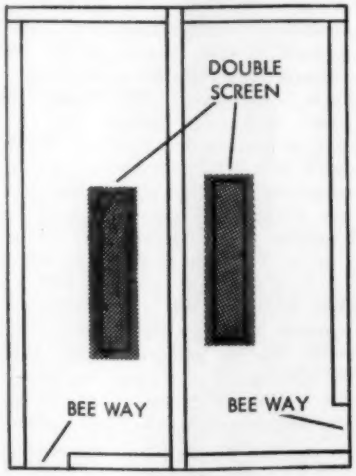


Fig. 3

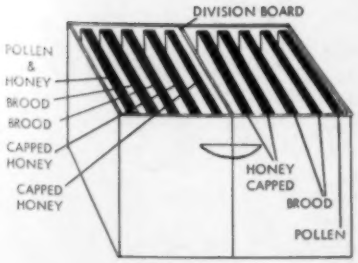


Fig. 4

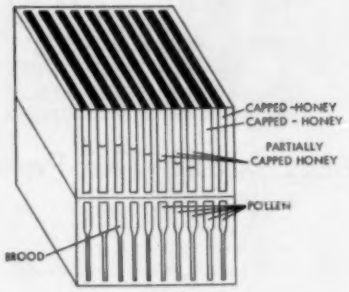


Fig. 5

bees to clear from entrances, dampness caused by dead bees is eliminated, mouldy combs are practically eliminated, no mortality from wintering, spring flight nuisance reduced to a minimum, up to 40 lbs. more honey can be removed from each colony, economy in space saving, transporting in spring is far more convenient, skunks could not clean out the colonies as only the lower one could be affected, and many more advantages could be related.

Stimulate egg laying in spring as early as required by pouring or spraying syrup on either of the outer combs of each nuc, place sacking or other moister absorbing material between inner and outer cover and wrap hive in tar paper, fastening with staples or string, with razor blade or sharp knife cut away paper from each bee-way.

A month later they can be checked over, fed as before or set out in separate hive bodies but keep well wrapped until all danger of ground frost is passed.

Sixty Years With The Bees

by H. A. Bushby

I spent the first forty-five years of my life on a Kansas farm and the last forty in the fertile irrigated section of southern Idaho.

During the summer of 1894 as a teenager on a Kansas farm, I caught a swarm of bees and that was the beginning of sixty years of study and care of the honey bee. Little was known about beekeeping in Kansas then and what few bees there were were housed mostly in kegs or boxes and surplus honey was harvested by boring auger holes in the top and setting an empty box on this for the bees to store their honey in.

I became so much interested in the bees, however, that I subscribed to magazines and books and bought a modern hive known as the St. Joe hive, made by Abbott in St. Joe, Missouri and in two or three years I had twenty-five colonies in these hives.

I became overzealous in caring for them and packed them with straw for winter without proper provision for the escape of moisture so they became very damp and, in three weeks of subzero weather in January, these clusters froze and I had a total loss. If I had put empty supers with dry leaves over the colonies to absorb the moisture, the loss would have been prevented.

So then I started to build up again. I made a deal for seven colonies paying for them in labor and, by using my empty equipment, I managed to increase to my original number and so by fall I regained twenty-five colonies with an abundance of winter stores.

Starting early in the spring, as we know, the queen begins to lay in the center of the brood nest increasing her laying as the season advances and as spring bloom comes, the bees start to gather pollen and nectar and build to a large colony at which time they often get ready to swarm which poses a problem in management for the beekeeper.

Following the swarming period, comes the time of crop stories and harvesting of the honey and this brings us back again to winter.

The only reason I mention this is to say that a beginner usually gets into this cycle by trial and error and I would suggest strongly that they study bees and beekeeping all they can, especially the magazines and books.

I am often asked how much honey a colony will produce in one season. Of course, this depends on location and weather. For instance in 1951 I had 150 colonies near the city limits of Boise, Idaho. When July came I realized I had too many bees for the location so I moved them thirty miles to an alfalfa seed district and they produced over 50 pounds average of No. 1 comb honey in thirty-five days. If they had been left at the old place, there would not have been any surplus crop. So it can be seen that the crop depends on weather and the availability of nectar bearing plants.

When I moved to southern Idaho in 1919 I soon learned that the bee industry was a major one in this vast irrigated area of southwestern Idaho and eastern Oregon near the Snake River. In addition to honey and beeswax, beekeepers there derive some revenue from the orchardists and seed growers for furnishing bees for

pollination. The fee runs from as little as $2.00 per hive up to as high as $7.00 or $8.00 in some isolated districts.

There is one operator in the Boise valley who has about 10,000 colonies over a wide area and produces more than 600,000 pounds of honey a year. This productive area comprises mainly the land irrigated by the waters of the Snake, Payette and Boise rivers and their tributaries in southwestern Idaho.

If the growers of fruits, clover and alfalfa seed realized the real need for bees as pollinators, there would probably be more cooperation with the beekeepers and the use of dusts and sprays would be done at times when the bees are the least injured.

Boise, Idaho

Commercial Operator

Drums Along The Peace

by Alan M. Frost

The wise old Indian nodded his head at the surge and power of the mighty Peace River. For centuries this grand stream had tumbled with seeming ecstasy toward the distant north and eventual freedom in the Arctic Ocean.

The rain God had been good this summer to the parched earth, growth of grasses, flowers and trees had been phenomenal, a season of plenty for all, for man, for animal, for insect.

The Peace River Country from Dawson Creek to Fort Vermilion presents a lovely picture of provident nature at its very best.

The rumble of drums is different now to that of a century ago. Then it was the symbol of freedom, the means of communication for the great Indian tribes who frequented the Valley. With the coming of the paleface their freedom was not the same. Vast areas of bush were cleared for agriculture, all the noises and smells of gasoline driven vehicles penetrated most everywhere in the once untouched forests.

The rumble of drums today is the seventies and the forty-five gallon barrels being shipped in for the '60 honey crop.

Most beekeepers in the wide Peace River basin have little time to dwell on the history of the past, the present offers enough problems. Too little good flying weather this year for bees to store dandelion honey, colonies were two weeks behind last year, there was a wide variation in strength of hives, queen losses have been high.

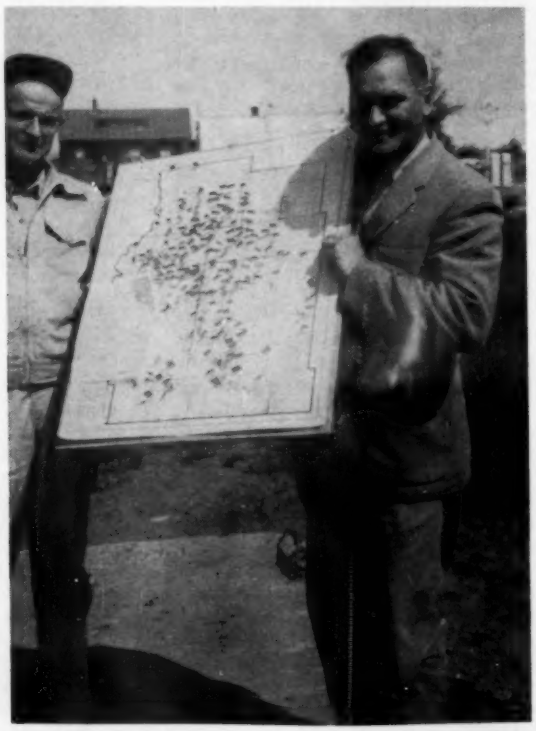
Good manipulation and management stood out this season. Firstly, the placing of plenty of honey and pollen stores with the package at installation. Secondly, wise choice of queens from stock most suited to cooler nights and fast build-up. Thirdly, the feeding of syrup where necessary to stimulate brood rearing and at the same time to provide water to enable easy access by bees to stored honey.

Colonies need to be regulated, (taking care that no disease is present), transfer of pollen, honey and brood from strong to weak, build up the poor, and take from the rich, make hives of former prevent swarming in the latter.

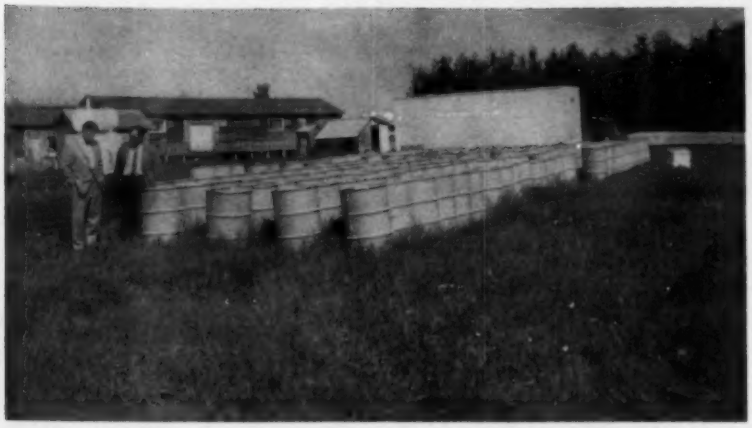
Locations are important and where possible are on high ground, well sheltered from prevailing winds with maximum sunlight. Numbers of colonies would run from 30-60 and one need be sure that there is ample flora for each apiary.

Placing of brood chambers and supers calls for timing. Don't put the first one on too quickly, make sure that the bottom box is well filled with bees first. This keeps the colony compact and helps them maintain warmth.

Fifty colony beekeeper, Les Eames, Beaverlodge, Peace River country. Eames is Secretary of the Beaverlodge Association.



Jack Edmunds, Alberta Provincial Apiarist, discusses crowded locations in Peace River country with John Dufrense. Each flag shows a bee location.



Left, Paul Pawloski, Alberta Co-op Manager, discusses honey markets with Jack Edmunds, Apiarist.

The first honey super likewise needs to be placed on the hive when there are a good number of bees in the second brood chamber, this one can be early, but better not late because a crowded double hive can swarm quickly. Because days reach into the nineties and because of the heavy rapid honeyflow, ventilation, through big entrances and slightly staggered supers, helps the bees and helps to prevent swarming.

In this far Northland poor queens cannot be tolerated, honey gathering days are so few, (although long flying hours do help) hives must be good or else doubled up after the middle of June.

Beekeeping in the Peace is not as peaceful as it used to be. Crops are rarely big unless good management is employed. The number of beekeepers has tripled and the number of colonies increased six times in 15 years. Not so much sweet clover now as then, and many more bees per acre on what is left. Nevertheless in seasons of plenty such as '60, good crops are likely for good beekeepers, and to see the beautiful white honey so rapidly stored is gratifying to those who make such hectic preparation.

Rape honey with its fast granulation has necessitated changes in the honey take off. Where possible, as soon as combs are three parts sealed, honey is removed and extracted and supers put back on. Good economy here because less equipment need be used and capital outlay is less.

Everything considered, the long cold winter, the great pilgrimage each year to the South for packages, the uncertain summer weather, the cussed bears, etc., etc.; of the beekeepers who have settled here (and in reality many of them pioneers) few ever wish to leave this lovely last frontier of beekeeping.
Alberta

Precautions With Weed Sprays On Bird's-Foot Trefoil

by Charles Mraz

In the July issue, Eugene F. Dietz gives some helpful hints on how to get a stand of bird's-foot trefoil. While most of his recommendations are excellent, a word of caution should be made on the use of weed killers with this crop. While in theory and under short term control conditions, weed killers are supposed to control weeds in trefoil which is fairly resistant to them; but under practical, long term conditions, results of such weed control are questionable and perhaps in some cases, even detrimental.

While 2-4-D will kill many annuals and broad-leaf plants, there are a number of weeds it does not kill. The tendency is when susceptible weeds are killed off, for the resistant weeds, especially perennials to quickly take over even faster than the trefoil.

Dalapon has some control over grasses, but does not kill the perennial grasses in most cases, but just stunts them temporarily, and the following year these grasses often recover with greater vigor than the trefoil. While immediately following Dalapon treatment the trefoil appears to be ahead of the grass, the next year may show a reverse situation.

Mowing is a much safer method of weed control as trefoil can stand it much better than the weeds in most cases. While Empire seems quite resistant to weed killers, Viking and Mansefield can be damaged quite seriously by weed killers. As a rule, annuals do not harm a trefoil stand too seriously. The first year trefoil doesn't do much anyway and the following year when annuals do not come as thickly as the first year, trefoil will move ahead and crowd them out very quickly. One of the best stands of trefoil I've seen was the year following a solid infestation of wild carrot. When the carrot finished its two year cycle, trefoil took over completely.

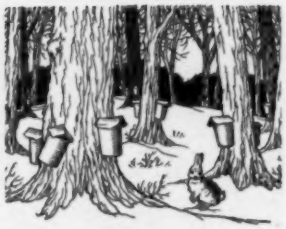
The most serious objection to use weed killers like Dalapon is its danger in contaminating milk if the trefoil is to be used for dairy cows. Trefoil cut from a field that was treated with Dalapon the year before, is very likely to show up in the milk from cows eating such hay. Since there is no tolerance for any weed killer or insecticide in milk, such milk can be condemned for use as food.

While such chemicals are not necessarily toxic, in fact some show hardly any toxic effects even in large amounts, yet many of them produce within the body of plants and animals the identical effects produced by radiation and are known as radiation-immitating chemicals. In any decision of this kind one must consider the question of what possible good it will do against the possible harm.
Vermont

Effect of Pesticides

A grant of $300,000 from the John A. Hartford Foundation of New York has been given to Stanford Institute of Research at Menlo Park, California, for the study of the effects on people and animals of pesticides used on food crops. According to Dr. Dale Coulson, manager of the Institute's Analytical Chemistry Laboratories, there is a great need for diagnosis and treatment of illnesses resulting from pesticide problems. They hope to develop a method for rapid diagnosis of chronic pesticide poisoning in humans. The use of organic pesticides and chemicals in connection with animals and human food production has increased tremendously in recent years. This has materially increased agricultural productivity, but it also has developed a source of contamination of crops and animal tissue consumed by humans.

Special Features



A HONEY PLANT PAR EXCELLENCE

BY STANLEY PALMER

A honey plant which has been grown in Saskatchewan since 1943 has gained wide popularity among beekeepers in the past few years as a heavy yielder. It is an annual rape. It should not be confused with the well-known biennial Dwarf Essex rape used in many places for hog pasture.

Annual rape is a member of the mustard family which includes cabbage, cauliflower, radish, and turnips. Its Latin name is Brassica. Rape, a cruciferous plant, has been grown for centuries in all parts of Europe and India which indicates its wide range of adaptability.

Colza oil is made from the crushed seeds and this is of considerable commercial importance as a lubricant and was at one time used as an illuminant. In Saskatchewan where 400,000 acres were grown last year, salad oil, margarine oil, (as an additive to motor oil and grease) marine oil and high protein meal for livestock were made from the crushed seed.

As a nectar producing plant, I think it has no equal for its reliable and heavy nectar secretion every year under varying and sometimes adverse climatic conditions. It has a long blooming period. It is adaptable over a wide range of soils and it has a hardy and vigorous growth. It will withstand to 7 degrees of frost as a seedling and up to 15 later on. It is very easy to grow.

There are two main varieties of annual rape here. The first one is Polish (turnip type) rape which is early flowering and has a shorter time of bloom (3-4 weeks) and a height of 2-2½ feet. The second variety is Argentine (cabbage type), which is later flowering and has a longer blooming period (5-6 weeks) and a height of 3-3½ feet.

The annual rape plant somewhat resembles a wild mustard. It has a branching stock with many sub-branches and the flowers are open type, bright yellow, leaves about the size of a spectacle case with the seed held in long pods.

Its culture is similar to that of wheat, oats or barley. Any soil suitable for growing grains will be fine for rape. It requires as much moisture as grains, perhaps more although it will do quite well under drought conditions. Rape grows here on an average growing season's rainfall of 7 inches and has performed satisfactorily on 3 to 4 inches when seeded on summer fallow. Seems to prefer cool growing conditions, yet it thrives almost as well and secretes its nectar freely in the 90 degree heat of midsummer as long as there is moisture. With plenty of moisture, it will have flowers and the seed will ripen on the plant at the same time. It is a vigorous grower when once started, crowding out most weeds. However, it cannot be sprayed with 2-4-D for weed control.

Stanley Palmer standing among the flowers in annual rape field.

Rape seed is sown with a press or ordinary grain drill one inch deep, at the rate of 10 to 15 pounds to the acre. Seeded at 10 pounds it will grow branchy with many sub-branches and flower longer. With more than 15 pounds it will grow a straight stalk with only sub-branches which mature earlier. Annual rape will flower in 45-50 days from the date of sowing, ripening in 90-100 days. It yields about 1000 to 1500 pounds of seed to the acre.

Two or more later sowings can be made to extend the flowering for 2 or more months in regions where the climatic conditions allow this to be done. I believe any region where Dwarf Essex rape thrives annually, will do equally well.

It seems strange that annual rape flowers are self-pollinating, thereby requiring no insects to cross pollinate, yet it gives nectar so freely. A field of rape in flower is a most beautiful sight with bright yellow flowers. You can see the nectar glistening in the bottom of the flowers all day long.

To illustrate my firm belief that annual rape will supersede all the clovers and alfalfa as a honey plant, I would like you to consider the following figures taken from my scale hive records of yields obtained from it. I have kept colonies on scales for the last 16 years. When using ordinary Italians I considered it good, when a wintered colony on a good flight day would bring in 7 to 10 pounds of sweet clover nectar. Now it is no trick at all for an equal colony, using Starline hybrid queens, pastured on annual rape to gain 15 to 25 pounds on a good flight day with a maximum of 33 pounds in a single day.

There are only a limited number of flight days each season so if a colony can get an extra 5 or 10 pounds each day of the flow, your yields are greatly increased.

My best wintered colony yield on sweet clover was 175 pounds; packages 125. Here are colony yields during the past five years using Starline bees (a most vigorous productive bee) and the major portion of the honey coming from annual rape, with fields 2 or 3 miles distance:

	Wintered colony on Scales, lbs.	Highest days gain of nectar	Package Colony
1956	620	33	375
1957	557	29	350
1958	443	30	300
1959	392	19½	280

Weather for the first three years was better than average but during the last two years because of adverse weather, flying conditions were somewhat restricted and intermittent.

The total nectar gathered in a 31-day period for July has ranged from 209 to 392 pounds. From gross nectar brought in to total honey gain, a loss of only 25% has been the rule each year which I believe shows the high sugar content of rape. For example in 1957, the gross nectar was 735 pounds, loss showed 178, for a net

honey gain of 557; in 1959 with a total nectar gain of 517, loss of 127, net honey gain 392.

Rape honey is light yellow in color, white when granulated. It has a fine granulation and if pure, it spreads as easily as butter, but if it is mixed with clover or other nectar plants it is more firm. It has very little flavor so even the most critical of buyers ask for more. There is no need to cream rape as it creams itself naturally.

It is a fact that the finer the crystals are in granulation, the sooner granulation occurs and it is of a fatty consistency. Rape honey, since it has a fine texture, will granulate in the comb in about six weeks from when the bees started gathering it so it must be extracted before that period. It will start granulating in the cans about a week after extracting. This is a point which must be kept in mind.

It is best to top super only, then the bees will fill one super before starting on the next. Rape is not likely to be suitable for comb honey because of its early granulation.

For those who wish to try annual rape, seed may be obtained from Early Seed and Feed Ltd., 198 Ave. A. South, Saskatoon, Sask. Canada. The price is 8 cents per pound in 100 pound sacks plus 25 cents for the sack; slightly higher for small lots. Seed may also be bought from Brett-Young Seeds Ltd., 416 Corydon Ave., Winnipeg, Manitoba. Their price is $17.00 per 100 pounds and 15 cents in small lots. There will be a few dollars extra to pay for freight, duty, brokerage fees, etc. Prices are both for Argentine Golden and Polish varieties.

North Battleford, Sask.

A really large field of annual rape.

Production: from left to right, package colony; wintered colony on scales; next two, wintered colonies; at right, another package colony.

Beekeeping in South Dakota

This is the title of a Extension Circular 565 from the Agricultural Extension Service of the South Dakota State College in cooperation with the United States Department of Agriculture. It is written by R. J. Walstrom and W. M. Hantsbarger.

It is a full ABJ size page publication of 16 pages with excellent illustrations. It covers the usual advice on how to start beekeeping, the make-up of the colony, equipment, securing bees, location, installation of packages, seasonal management, diseases of bees, poisoning, enemies, and bees as pollinators. A real thorough-going job. We recommend it. Those who are interested may obtain a copy from the Extension Service, South Dakota State College of Agriculture, Brookings, South Dakota.

Production: from left to right, package colony; package colony; wintered colony on scales; wintered colony; package colony.

Miss Monicca McNutt, American Honey Queen for 1960

Tour Of Our American Honey Queen

by Mrs. Carl Soder, Chairman,
American Honey Queen Committee

Miss Monicca McNutt (Honey Queen for 1960) did 5 T.V. shows and 2 radio shows, besides having still pictures shown over television shows and write-ups and picture in many newspapers.

Her first television show on this tour was over WCCO T.V. for about 7 minutes. Some 60 letters were received for recipes she offered on this program.

Next was a visit to the Governor's office. This was covered by the associated press and local newspapers. Our queen presented the Governor with honey bears with her own label. Local papers carried the account and also her picture.

Her next T.V. appearance was on KSTP; a noon audience-participation program "Treasure Chest" on the air about 4 minutes. About a case of honey was given as prizes to the audience.

Next, KMS-T.V. station. This station did not have quite as wide coverage as the former station. She was on about 12 minutes. This was a P.M. program for ladies "What's New." More than 50 letters were received for honey recipes. KWOM University station 4 minutes with queen on the air. Homemakers program. More than 25 recipe requests received.

In the afternoon a 15 minute interview over WTCN radio with over 50 letters received for recipe books. That afternoon the queen and her escort journeyed about 200 miles to the convention at Detroit Lakes, Minn. She attended the meeting visiting and meeting many of the beekeepers and their wives. The same day she was called on to do a T.V. show over WDAY, Fargo, North Dakota. Saturday at noon the queen appeared on the Alexandria T.V. station for 12 minutes.

Mr. and Mrs. Soder, the queen, and her escort (Mrs. Little) journeyed from Detroit Lakes, Minn. to Sioux City on Sunday. Our accommodations at Sioux City were taken care of by the Robb Ross Company.

Monday was a busy day—

1. Queen was interviewed by the Sioux City Journal.
2. Tour of the Robb Ross plant where the queen was televised with Mr. Soper on KTIV-T.V. channel 4.
3. The weekly Sioux City Press Dispatch published her picture and an interview on the new highway with Sioux City's skyline as a background.
4. Lunch was at the Green Gables Cafe with a corsage presented to the queen from the Dadants.
5. Next were tours of Sioux Honey Plant, Dadant and Sons branch and Wally's Bee Enterprises.
6. Our queen visited the Sioux City Chamber of Commerce.
7. Then to the Starlight room where she was interviewed by Don Stone.

8. Mayor George Young presented the queen with the key to the city which was televised by KVTV channel 9.

9. After a short tour of the city and dinner at the Biltmore Motel, the queen's party left for Stratford, Iowa.

On Tuesday Miss McNutt met Mr. Clyde Spry, Secretary of Agriculture of Iowa, who presented the queen to the Governor whom Monicca presented with a gift of honey and a letter of greeting from the Governor of Tennessee to Governor Loveless. This publicity was handled by the Governor's publicity director. Next a visit to the Iowa Marketing Division where honey is being recognized. Then to KRNT-T.V. where she was interviewed on a very popular program. About 6 minutes were given her. Pictures were published in the Des Moines Register and Des Moines Tribune.

Wednesday she was on television at Fort Dodge for about 20 minutes. This was also the introduction of the County Honey Queen contestants.

Thursday we left for Hamilton, Illinois where Dadant and Sons took her through their plant. The newspapers were there to get pictures and stories. Then in the afternoon on to Quincy, Illinois where our queen did another T.V. show. From there she left on Friday morning for home.

I wish to thank Mr. Floyd of Minnesota who arranged the publicity also Mr. McCoy and the people in Sioux City who did such a wonderful job; Mr. Soper, President of Robb Ross; Wally Johnson; Mr. Erwin Glew, manager of Dadant and Sons, Sioux City, Dadant & Sons of Hamilton, Illinois and last but not least Mrs. Leslie Little who gave her time to accompany the queen and Mr. Little who convinced the Governor of Tennessee to send Monicca. Again I think the industry owes these people a big thank you.

This trip cost the association nothing as it was paid for by the Governor of Tennessee. You have received thousands of dollars worth of publicity free, by having this honey queen and also by having good cooperation from the members.

I also want to say that our queen does a very excellent job of selling her product and is very nice and pleasant to work with although I know she must have become very tired. Wouldn't you? Thanks Monicca.

That "DIGEST" Article

by M. P. Traphagen

I suppose most of us have read the article in a recent issue of the Reader's Digest about Dr. Jarvis' book on "Folk Medicine." The writer, Lois Mattox Miller, says "Honey is a wholesome food but no better than sugar, white or brown. Also medical authorities insist that honey does not possess the curative powers ascribed to it by food faddists."

By extensive reading I gather that it is not the food faddist alone that claim honey to be valuable but prominent men in the medical field also make such claim for honey. Perhaps this writer is not aware of the fact that after 50 years of use of honey in various ways it has been found to be antiseptic and to destroy pathogenic bacteria.

Dr. Paul Luttinger of the Bronx, New York City, had marked success with honey in infant feeding in hundreds of cases. Dr. M. W. O'Gorman, chief of the Division of Hygiene of the Department of Public Affairs in Jersey City, used honey for 25 years for infant feeding. Dr. De. Goff of France contends that about 80,000 children die in France annually because of the use of refined sugar.

Dr. Seal Harris, of New Orleans, warns of feeding sugar to children. Dr. W. Deeks, Dr. Chas. C. Keeler and Dr. H. G. Flood all condemn excessive use of sugar for children. Dr. Deeks found that sugar may result in poor nourishment so that the child becomes pasty looking, restless, irritable, particularly at night and frequently suffers from incontinence of urine during sleep; that they have decayed teeth, considerable constipation or diarrhea and are susceptible to rheumatism, bronchitis and sore throat.

Dr. F. G. Banting, discoverer of insulin, as well as Dr. Harvey Wiley, former chief chemist of USDA also warned of the indiscriminate use of sugar. Add such notables as Dr. E. P. Joslin, professor of medicine of the Harvard Medical School, Dr. Arnold Lorand, international physician and author, Dr. B. P. Hawk, Jefferson Medical College Philadelphia, Dr. C. H. Englesh, medical director of Lincoln National Life, Dr. Norman Jellife, Bellevue Hospital, New York City.

Now go to Germany to see what Dr. Lorand of Carlsbad thinks of honey. "In digestive disturbances honey is of great value; honey for the anemic, and the dyspeptic and for convalescents and the aged is an excellent reconstructive tonic, in malnutrition no food for drug can equal it."

Dr. Schacht of Weisbaden claims to have cured hopeless cases of gastric and intestinal ulcers with honey without operations. Dr. Lorand agrees with this. Dr. Schacht emphatically states, "This news has not reached 99% of the medical profession."

Dr. Heermann of Kassel-Fortschritt and Dr. James F. Reinhart suggest honey for rheumatics, nervous conditions, tubercolotic glands, etc. Dr. Heermann has used honey with success for 26 years (Fortschritte De Medizin vol. 54-1936 and Annals of Internal Medicine December 1935).

Dr. George D. McGrew of the Army Medical Corp, William Beaumont General Hospital, El Paso, Texas, Military Surgeon, states, "Thirty-three hay fever sufferers obtained complete or partial relief through the consumption of honey." Dr. A. V. Davidson of Russia, Dr. L. R. Emerick of Eaton, Ohio, the late Dr. H. J. Goos of Middlebury, Vermont also used honey successfully for diabetics.

Now how can the finds and the successes of these noted medical men be refuted?

I think it was the late Bernard Shaw who remarked "Every profession is a conspiracy against the laity." After sixty five years in the school of practical experience and hard knocks, I am led to believe that Shaw is right.

No one has ever heard of bad effects or death from vinegar or from kelp or from honey. On the other hand take one product of modern medicine namely "Cinchophen." The public will never know how many deaths occurred from its indiscriminate use. Also, who knows the bad results of modern so called wonder drugs? Not even the doctors know.

How can any intelligent person claim that sugar is equal to honey? Modern medicine concedes honey destroys many forms of bacteria. Will sugar solution do the same?

It would be enlightening for some of the critics to visit my place of business. Unknown customers stop in to purchase from 1 to 10-60 lb. cans of honey for individual family use and without solicitation tell a story of how and when they quit modern drugs, and started to use honey for arthritis, heart conditions, colds, hayfever, and found lasting relief. *They report that their family doctor advised the use of honey.*
New York.

Industrial Information

EDITOR, Robert Banker
Cannon Falls, Minnesota

THE HONEY PRICE SUPPORT PROGRAM

BY RUSSELL L. HAWES and CLARKE T. STAMPER
Commodity Price Stabilization Service, U. S. D. A.

From comments and correspondence received in the Washington office there appears to be considerable interest in more information on the Honey Price Support Program, its objectives, and its operation. This article, it is hoped, will help to provide this information and assist honey producers in taking full advantage of their price support program.

Legislative Authority

Section 201, Title II, of the Agricultural Act of 1949, as amended, requires the Secretary of Agriculture to make available to producers price support for honey at a level ranging from 60 to 90 percent of the parity price. During the last five crop seasons, the Secretary set the support level at either 60 or 70 percent of parity. However, the national average price received by producers has ranged from 88 to 97 percent of the parity price in the five seasons.

Honey prices are supported in two ways, by loan and by purchase agreement. First, let us discuss the purpose of loans and how they may be obtained by beekeepers.

Purpose of a Loan

Loans granted under the honey program serve several purposes. A beekeeper who obtains a loan may be better able to maintain his colonies and finance the production of his crop. Loans help to promote orderly marketing of the honey crop. Beekeepers are not forced to sell their crop when first extracted when prices may be at low levels. A loan can tide a producer over a temporary period of low prices.

Where to Apply

The first step in securing a loan is to make application at the county Agricultural Stabilization and Conservation office in the county where the collateral honey is stored.

When to Apply

Beekeepers may apply for a loan on honey during the period April 1-December 31 of the year in which produced. Any beekeeper who extracts honey produced by his own bees is eligible to apply for a loan. However, there are other requirements to be met before a loan can be granted.

Other Requirements

1. *Floral Source*—for honey to be eligible for a loan, it must have been produced from an approved floral source. Certain honeys having objectionable flavor are not eligible as collateral for a loan. Other so-called "nontable" honeys are acceptable as collateral but at a lower loan rate than the "table" honeys. "Nontable" honey means honey having a local consumer acceptance while "table" honey refers to a honey having a flavor with nationwide acceptance.

2. *Storage*—Loan honey must be kept in approved storage (excluding public warehouses) which is clean, dry, weather proof, and lockable. Each lot of loan honey must be segregated from other honey and must be appropriately labeled so that it can be readily identified as collateral.

3. *Containers*—Honey placed under loan is subject to certain container requirements. Among other things, the honey must be packed in clean metal containers not smaller than 5 gallons nor larger than 70 gallons rated capacity. The 5-gallon pack must be in *new* containers. New or properly reconditioned drums may be used. Most loan honey has been packed in 5 and 55-gallon containers.

4. *Inspection*—Prior to acceptance as collateral for a loan, honey must be inspected at the applicant's expense to determine if it meets the minimum requirements of "U.S. Grade C" or "U.S. Standard" grade and, in addition, must not exceed 20 percent moisture content (lower in certain cases). Honey offered for a farm-storage loan must have been stored in the required containers for at least 15 days prior to the drawing of samples by the inspector.

5. *Interest and Service Charges*—Beekeepers who receive honey loans in 1960 are charged interest at the rate of 3½ percent per year from the date of disbursement. All loans on 1960 crop honey mature on April 30, 1961. In addition, a nominal fee of 5 cents per 100 pounds of honey (minimum fee $3.00) is charged beekeepers to cover costs of processing loan applications.

6. *Release of Loan Honey*— Beekeepers who have stored honey as collateral for a loan may at any time obtain release of the honey by payment of the principal and interest.

7. *Liquidation of Loans*—All loans must be liquidated on or before the maturity date or the beekeeper is required to deliver the honey stored as collateral to designated points. The producer may pay off all or any part of his loan or reclaim any or all of his collateral honey at any time prior to delivery upon application to the county Agricultural Stabilization and Conservation office.

The county Agricultural Stabilization and Conservation office generally will not require immediate delivery of the honey upon the maturity of the loan if the beekeeper will inform such office that he has a good possibility of marketing his honey in commercial outlets within a reasonable time.

Purchase Agreements

A beekeeper who enters into a purchase agreement is guaranteed a price at the applicable loan rate for that portion of his production which he agrees to sell to Commodity Credit Corporation. CCC will not buy from the beekeeper more honey than the quantity specified in the agreement. On the other hand, the beekeeper is not obligated to sell to CCC. In fact, he is urged to seek commercial outlets for his crop.

Such items as where and when to apply, container specifications, eligible and ineligible honeys, and support rates are the same for purchase agreements as for loans. A service charge, at the rate of 2½ cents per 100 pounds (minimum, $1.50) is collected on the quantity of honey specified in the purchase agreement. This is at ½ the rate applied to loan honey.

(Across the page)

U. S. BEE CULTURE RESEARCH INVESTIGATIONS STAFF

Front row: F. E. Moeller, W. C. Roberts, D. F. Peer, S. E. McGregor, W. P. Nye, W. W. Whitcomb, J. D. Hitchcock, A. W. Woodrow. Back row: F. E. Todd, S. Taber, O. Mackensen, A. S. Michael, E. R. Jaycox, L. N. Standifer, M. D. Levin, G. E. Bohart, C. L. Farrar.

PERSONNEL BY STATIONS:

Madison
C. L. Farrar, Investigations Leader
F. E. Moeller
D. F. Peer
E. R. Harp (not in picture)

Beltsville
A. S. Michael

Baton Rouge
W. Whitcomb
O. Mackensen
W. C. Roberts
E. Oertel (not in picture)
S. Taber

Tucson
F. E. Todd
A. W. Woodrow
S. E. McGregor
L. N. Standifer

Logan
G. E. Bohart
M. D. Levin
E. R. Jaycox
W. P. Nye

Laramie
J. D. Hitchcock
I. Revell (not in picture)

Support Rates

The level of price support for 1960 crop honey is set at 60 percent of parity, adjusted to the 60-pound container, or 8.6 cents per pound. There are, however, differentials in the basic support price, determined by such factors as area where produced, color, and whether "table" or "nontable" honey. Loans and purchases are made on the basis of the following schedule:

Type and Color	Montana, Wyo., Colo., N. Mex. & States West thereof	Other States
	Cents per lb.	Cents per lb.
Table honey:		
White or Lighter	9.0	9.9
Extra Light Amber	8.0	8.9
Light Amber	7.1	8.0
Other Table	6.4	7.3
Nontable	6.4	7.3

For Further Information

It is suggested that any beekeeper desiring more detailed information should write, call, or visit his county Agricultural Stabilization and Conservation Committee office or contact the Sugar Division, CSS, USDA, Washington 25, D. C.

—CURRENT ITEMS—

Displays At Fairs

A Seven Page mimeographed paper of recommendations for displays of honey at Fairs has just come out from the American Honey Institute office. We recommend that you write them at 114 N. Carroll St., in Madison, Wisconsin for your copy. It is free.

Arkansas Pollen Booklet

Report Series 94, a 40 page booklet with the title "Nectar Flow and Pollen Yield in Southwestern Arkansas 1945-1951" has just appeared from the Agricultural Station at Fayetteville. It was written by Victor Thompson, now with the Department of Zoology and Entomology at Ames, Iowa.

The studies were conducted at the field station at Hope, Ark., under the direction of S. E. McGregor to obtain information on time and extent of nectar and pollen flows in N.W. Arkansas.

Five apiaries were observed where the flows occurred in late April to early May, June to July and September. Gains ranged from 111 to 232 pounds with an overall annual average of 148 pounds.

Important honey plants were holly, rattan vine, blackberry, sweet clover, buckwheat or eardrop vine, sumac and Spanish-needle. The booklet is a credit to the work of Mr. Thompson. We assume copies may be had by addressing the Experiment Station as above.

Plastic Bag Suffocation

Our branch manager, Erwin Glew, at Sioux City, Iowa, sends a clipping about a 16-year old farm boy who suffocated while wearing a plastic bag over his head to protect himself from bees when getting honey.

John Dover, 16, son of Mr. and Mrs. Cliff Dover, of Madison, Nebraska, was found by his father in a nearby vacant farm.

John and two friends had planned gathering the honey on Monday night but John decided to do it in the afternoon instead. Equipment found with him included milk pails and gloves.

The Beginner and Novice

Editor - W. W. Clarke, Jr.
204 Agricultural Education Building
Pennsylvania State University
University Park, Penn.

• *Question from*
Delbert Franz
Walton, Kansas

Since the honey harvest will be upon us soon I have a few questions to ask. Would the galvanized garbage cans that are on the market be suitable for a tank in which to heat honey before bottling it? They are low in cost and are about the right size for the small beekeeper. Also in connection with this would it be necessary to use some zinc conditioner on the cans if the honey was stored in them for any length of time? The reason for these questions is that I have read that the honey may be tainted if it is heated in galvanized containers.

Answer

Many small beekeepers use galvanized garbage cans as honey tanks. Put a honey gate on the bottom and coat the inside with one of the lacquers that are sold for this purpose. Both the gate and the lacquer may be obtained from the bee supply houses.

• *Question from*
William P. Jackson
Chatsworth, Calif.

I have completed the transfer of a colony from a box hive. There is considerable crooked comb left containing pollen and honey. Is there any way to make the pollen and honey available to the bees?

Answer

The bees will very quickly rob the honey out of the crooked comb if it is placed above the inner cover with the hole partly open. They seem to make very little use of stored pollen, unless it is in the brood nest and it is doubtful they will rob it out.

• *Question from*
Milan Robertson
Shellsburg, Iowa

How often do you recommend that requeening be done? What is the best way to do it? Can an amateur do it or does it take more experience? Can it be done without the necessity of locating the old queen?

Answer

We recommend that beginning and inexperienced beekeepers requeen every year. As you gain experience and knowledge, it may be possible to tell by the performance of the queen whether or not she should be replaced. A good queen lays a solid pattern of brood with no drones in the worker cells.

There is no one best way for requeening. One of the better methods is to use the mailing cage in which the queen is shipped and hang it down between two frames of brood. I like to remove the attendant bees so that bees in the hive immediately start to feed the queen. You must, of course, find and kill the old queen. Anyone can requeen. It may take a little time to locate the old queen but that is the only tough part. It may be necessary to remove a frame to make room for the queen cage, but this may be a good excuse to remove a bad comb and replace it with foundation or good comb.

• *Question from*
Ralph F. Baldwin
Grand Rapids, Mich.

I have only one colony but it is going to town with five supers above an excluder (July 24). Today, when I removed the top of the hive to add the fifth super, I found quite a lot of ants and ant eggs. I removed them before replacing the hive cover. What can I do to prevent this happening again? The hive rests on two rows of bricks about a foot above the ground.

Answer

Ants are a nuisance around the beehive but seem to do little damage. Many remedies are suggested, such as soap, tansy leaves, salt, etc., on the inner cover. I find the best treatment is to use chlordane powder around the bricks your hives are set on. Place the dust in such a position that the bees do not walk in the chlordane, since it is deadly to bees. I also let the hole in the inner cover open so the bees caught in this area may discourage some ants.

I like your hive stand; there is no reason why bees should not be set up in the air.

• *Question from*
Donald Hallarn
Grand Forks, N. D.

Would like advice about setting up a booth for our local Hobby Show in February. I am thinking of using two observation hives and would like the bees to be active as though they were working in a honeyflow. Is it safe to provide an entrance to the out doors? The show is in the city auditorium which is a spacious building. Can a screened cage be provided so the bees can fly from the hive? How about placing artificial flowers in the cage and spraying them with syrup? Would the bees gather the syrup and so appear to be working the flowers? Another question, what is the chance of the bees contaminating honey with insecticides dangerous to people?

Answer

Although it is possible, I cannot see any reason for giving the bees an outside entrance - I don't believe they will do much flying in February. They will last at least a week in an observation hive providing the hive is not crowded. We find that bees do not work well inside a building in cages. I think the display would catch a lot of eyes if the observation hive could be seen from both sides so the viewers could find the queen. Feed the bees sugar syrup and they will work, building comb and storing honey as though they were gathering nectar.

It is not likely that bees will contaminate honey with dangerous-to-human insecticides since it is probably more toxic to the bee.

BEE SMART..use clean, bright, tight... Continental Honey Cans

CONTACT THE NEAREST DISTRIBUTOR

GLENDALE, ARIZONA
Crockett Honey Company

PHOENIX, ARIZONA
Superior Honey Co.

ALHAMBRA, CALIF.
B-Z-B Honey Co.

CALEXICO, CALIF.
Laura Sheppard

LOS ANGELES, CALIF.
General Can Co.
Los Angeles Honey Co.
Sioux Honey Assn.
Superior Honey Co.

SAN BERNARDINO, CALIF.
W. D. Miles
860 "F" Street

SAN DIEGO, CALIF.
George B. Wright

SAN FRANCISCO CALIF.
General Can Co.

VALYERMO, CALIF.
Ross Apiaries

WESTMORELAND, CALIF.
Marvin Beatty

DENVER, COLO.
Cronkhite-Bosanko Supply Co.
S. Riekes and Sons, Inc.
Superior Honey Co.

PLANT CITY, FLA.
Kilgore Seed Company

ATHENS, GEORGIA
Dixie Canner Company, Inc.

CHICAGO, ILL.
R. Freund & Company
S. Riekes & Sons, Inc.

HAMILTON, ILL.
Dadant & Sons, Inc.

ROCK ISLAND, ILL.
S. Riekes & Sons, Inc.

DES MOINES, IOWA
S. Riekes & Sons, Inc.

SIOUX CITY, IOWA
Sioux Honey Assn.

WICHITA, KANSAS
S. Riekes & Sons, Inc.

CLARKSON, KY.
The Walter T. Kelly Co.

NEW ORLEANS, LA.
Amos C. Harris & Co.

GRAND RAPIDS, MICH.
A. G. Woodman & Co.

ONSTED, MICH.
L. M. Hubbard Apiaries

MINNEAPOLIS, MINN.
S. Riekes & Sons, Inc.

ST. LOUIS, MO.
S. Riekes & Sons, Inc.

MANHATTAN, MONT.
Cloverdale Apiaries

OMAHA, NEBRASKA
Barney Fink Container Co.
S. Riekes & Sons, Inc.

GROTON, NEW YORK
Finger Lakes Honey
Prod. Coop. Inc.

SYRACUSE, NEW YORK
M. R. Cary Corp.

FARGO, NO. DAKOTA
Magill & Co.

MEDINA, OHIO
The A. I. Root Company

OKLAHOMA CITY, OKLA.
S. Riekes & Sons, Inc.

NEWELL, SO. DAKOTA
Oscar H. Clark, M.D.

HOUSTON, TEXAS
R. M. Hughes Company
S. Riekes & Sons. Inc.

PARIS, TEXAS
Dadant & Sons

SAN ANTONIO, TEXAS
S. Riekes & Sons, Inc.
The A. I. Root Company

SALT LAKE CITY, UTAH
Miller Honey Co.
S. Riekes and Sons, Inc.

BOYD, WISCONSIN
August Lotz & Company

POWELL, WYO.
A. D. Hardy

CONTINENTAL CAN COMPANY

Meetings and Events

National Honey Week
Oct. 24 through Oct. 29

This is the occasion to step up your honey marketing, particularly on the retail level. Plan to step in line with all marketing efforts during National Honey Week. If you want advertising material write to American Honey Institute, Madison, Wisconsin.

Alberta Short Course
University of Alberta
Oct. 17 - 21

October 17 to 21 inclusive are the dates set for the first Beekeepers' Short Course ever to be held in Alberta. The course is sponsored jointly by the Department of Extension of the University of Alberta, the Department of Agriculture and the Alberta Beekeepers' Association. Mr. Jack Edmunds, Supervisor of Apiculture in the Department of Agriculture is in charge of arrangements. He is assisted by Mr. Alan Frost. Lecturers and demonstrators for the course include Dr. Frank Todd, Tucson, Arizona. (U. S. D. A. at University of Arizona.), Professor G. F. Townsend of the Apiculture Department of Ontario Agricultural College, Guelph, Dr. G. Hobbs and Dr. N. Church of the Experimental Farms in Lethbridge. Several experienced beekeepers of Alberta will also take part.

Clydie A. Bird
Sec. Treas.

Georgia Association
Homerville, Oct. 17th

There will be an annual meeting of the Georgia Association at the courthouse in Homerville, October 17th. Homerville is the center of the gallberry honey area, on the edge of the Okefenokee swamp in southern Georgia. Everyone is invited.

J. H. Girardeau, Jr.
Secretary

Middlesex County (Mass.)
Waltham, October 29th

After a summer of interesting meetings, the Middlesex County Association will hold their first indoor meeting and annual banquet at the Waltham Field Station, Waltham, Mass. on October 29 at 7:00 p.m. This will feature a smorgasbord supper catered by well known Scandinavian caterers. For reservations at $2.50 per person please contact Richard Corrigan, 946 Main St., Reading, Mass. All people interested in beekeeping are most welcome to our meetings and are invited to become members. An interesting winter program is being planned.

Betty Carlson,
Corres. Sec.

Annual Convention
Indiana State Association
Indianapolis, October 29

The Indiana State Association will hold its annual meeting Saturday, October 29th at the Severin Hotel, Indianapolis.

The program will feature talks by Dr. E. C. Martin of the University of Michigan and Dr. B. E. Montgomery of Purdue University. Noon luncheon at the Severin.

Gilbert Perigo
Secretary

Alberta Annual
Edmonton, October 24-25

The Annual Convention of the Alberta Association will be held in Edmonton on October 24 and 25 in the Kingsway Motor Hotel. Alan Graham, President, will preside at the meetings. A banquet will be held at the conclusion of the sessions.

Clyide A. Bird, Sec. Treas.
Edmonton, Alberta

Nebraska Annual Convention
Lincoln, Oct. 27-28

Nebraska beekeepers will hold their annual meeting at Lincoln, October 27 and 28 at the College of Agriculture. October 27th will be a business meeting and 28th will be beginners day.

Registration at 9:00 AM.
Secretary-Treasurer's report.
Nominating Committee.
Inspectors report.
Honey Queen committee and introduction of Nebraska Honey Queens.
Mell Steen of State Game and Forestation Commission.
Discussion of spray problems.
Election of officers.
11:45 Lunch.
1:00 PM.
Henry Hansen, American Beekeeping Federation "Omaha Convention."
Legislative committee report.
Nebraska Honey's report.
Unfinished business.
6:30 PM. Banquet at Cotner Terrace
Crowning of Honey Queen.
Entertainment.
Beginners day October 28.
Registration 10:00 AM.
General discussion folowed by complete coverage of beginner's problems in bee managment.
Question and answer period.
Charley Moosman, President
Valentine

Northeastern Kansas
October 2nd, Lexington

All interested in bee culture activities, as well as members of the Northeastern Kansas Association, are cordially invited to attend the next meeting of the organization, Sun., Oct. 2, 2:30 p.m., at the home of Mr. and Mrs. Chas. A. Reike, 7540 Quivera Road, Lenexa, Kansas. Refreshments will follow the meeting. To reach this address go south on Neiman Rd., or old Highway 50, directly south of Shawnee. From Highway 10 proceed to 75th St., then westward one mile (or first crossroad, turn left (south) and the Rieke home is the first house, or the west side after turning south, at 75th and Quivera. Wally Johnson of Wally's Bee Enterprises, Sioux City, Iowa, is expected to be the guest speaker. We know you will want to hear this energetic man. Join this growing organization and get something worth while.

R. J. Ferguson.

Midwestern Association
Kansas City (Kansas), October 9th

The Midwestern Association will have its regular monthly meeting at the American Legion Hall, 1723 Quindaro, Kansas City, Kansas, at 2:30 p.m. Sunday, October 9th. There will be a guest speaker and a question and answer section. Refreshments will be served. Everyone welcome.

James A. Worrel
Secretary

Iowa Annual Meeting
October 28th and 29th, Memorial Union Building, Iowa State University

The annual meeting of the Iowa Association will be held at an earlier date this year, October 28 and 29, at the usual meeting place, Memorial Union, Iowa State University, Ames, Iowa. The program this year will be devoted extensively to the activities of the Association in the past and the development of a program of effort for the future. It seems that this is essential under the existing conditions. It is hoped that there will be a large attendance to participate in the development of the plans. There will also be interesting presentations by producers on their problems and how they have met them successfully. An outstanding feature of the program will be the crowning of the Iowa Honey Queen by Governor Herschel C. Loveless at the annual banquet on the evening of October 28. Complete programs will be available to all by October 15.

F. B. Paddock
Iowa State University

Connecticut Association
Hartford, October 22nd

The fall meeting of the Connecticut Association will be held October 22 at the Y. M. C. A. Hartford, located at the corner of Jewel and Pearl Streets. The starting time is 10 A.M. Lunch will be in the Y. M. C. A. Cafeteria.

The program in part will be reports on the current honey crop, wintering and a honey cookery goods auction. All beekeepers and friends are invited as a good time for all is in store for them.

Philemon J. Hewitt, Jr.
Publicity Chairman

Wedding Bells

This photo of a wonderful lady is Mrs. Newman I. Lyle, Sheldon, Iowa. We shook hands and beamed with Newman and Helen recently at Ames, Iowa. Many of our readers know Newman well. He is a commercial operator and a farmer; active in Sioux Honey Association and the Federation; leader in soil conservation.

Helen Strandberg is from Phrimgar, Iowa. Before her marriage she was a legal stenographer; previously an abstractor and she taught speech in the Norfolk, Nebraska schools.

You are both great "guys" and - - well, years and years and years ahead, hum?

NEW SUPERIOR PLANT AT FRESNO

Picture taken at the new plant of the Superior Honey Co. in Fresno, California. These are the folks - at left, A. R. Miner who leased the plant to Superior; I. Ben Reynolds, Manager, and, at right, Ralph Stone, from the South Gate plant. The new plant will sell supplies and containers and buy beeswax and honey.

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The Federation

Secretary Joseph O. Moffett
115 So. College Ave., Fort Collins, Colorado

Queen plugs honey on radio and TV. Monicca McNutt, the 1960 National Honey Queen, appeared on five TV shows and 3 radio programs during her recent northern tour. She met the Governors of Tennessee and Iowa.

Several newspapers ran articles about her. "The Des Moines Register" and "The Des Moines Tribune" published pictures and articles concerning her tour. The queen was well received and favorably presented honey and the honey industry to a large number of people.

National Honey Show being held. While this is being written, the National Honey Show is under way at Detroit. This show brings much publicity to honey. The Federation Honey Queen plans on attending the show.

Let State organizations know your wishes. In the next few months many states will hold their annual meetings. Beekeepers should attend these meetings and draft programs they would like the Federation to promote. The activities of the Federation are determined by the members, including representatives from each state at the annual convention.

Liability plan available for Federation members. The liability plan offered by the Manufacturers & Wholesalers Indemnity Exchange at the Phoenix convention is now available to Federation members. This company has insured beekeepers in the Western states on an individual basis for many years. Beekeepers who have insurance with this company speak very highly of it.

Months ahead critical for Federation. The next few months are vital to your organization. Dues and membership are ahead of last year. If members and money continue to come in better than last year the Federation can end the year in the black.

The Federation lost $3,000 in 1958, and $1,000 in 1959. We must at least break even in 1960.

Join with your fellow beekeepers today in the growing Federation. Help advance the bee industry. Minimum dues are $3.00 with a suggested payment of 4c a colony for beekeepers having over 75 colonies.

Message from President Budge

The Federation was organized to promote the welfare of our Beekeeping Industry. Each year at the annual convention the membership elects a group of officers to carry out the purposes of the organization and the membership expects the officers to fulfill this obligation. I am sure that those that have been given this responsibility have a desire to do their best to fulfill this trust.

It seems that the membership fails to realize that an organization of this kind that must maintain an office and a full time Secretary needs money to carry out the program expected of it.

At present your offices are faced with meeting YOUR financial responsibilities without the necessary funds. YOUR executive committee must borrow money on their own individual credit to meet YOUR obligations. I don't believe you want or intend that it be this way.

Let us not let it happen this way. SEND IN YOUR MEMBERSHIP DUES NOW. We need new members. Go to your neighboring beekeeper and solicit his membership in the only national organization that you have that is working for your welfare.

PLEASE ACT NOW. DON'T PUT IT OFF UNTIL TOMORROW. HELP YOUR OFFICERS FULFILL THE RESPONSIBILITIES THAT YOU HAVE PLACED ON THEM.

I have every confidence that you will help in this emergency. I am sure you are unaware of conditions as they are and the help that we need.

L. R. BUDGE, Pres. American Beekeeping Fed.

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Crop and Market

by M. G. Dadant

CROP COMPARED TO LAST YEAR

Some few fortunate sections have an improvement in the crop over last year and one of these is the most of the South where Louisiana reports even 300% of last year and Florida from 10 to 25 per cent above a year ago. The other states similarly from 10 to 20 per cent above. This extends up into Virginia.

However, the New England States will be about equal to last year; New York also. The balance of the North Central States will no doubt rank considerably less than a year ago although Michigan and Wisconsin will both equal about last year's crop.

Iowa will fall short, Minnesota perhaps just a little short of last year and North Dakota not over 60 per cent whereas South Dakota probably will equal last year's crop. Nebraska has a very poor crop this year and strangely enough Kansas, Missouri and Oklahoma have considerably more than a year ago. In the intermountain area, Montana probably has fared about as well as any with some 75 to 85 per cent of last year's crop. The eastern slope of Colorado similarly above last year but the balance of the whole area indicates considerably less honey than last year and this includes Idaho, Utah, Arizona and New Mexico. Nevada may have somewhat more. Oregon has the equal and Washington perhaps equal with California perhaps 25 per cent above last year's crops but still far below normal and, therefore, not "cutting any ice" with exportable honey.

The eastern Canadian provinces are below a year ago with the prairie provinces as good or better and British Columbia no doubt better than a year ago.

CONDITION OF BEES AND STORES

In practically all instances, reports are to the effect that the condition of bees is going to be quite satisfactory for the winter season and this is especially so in those fall honey areas where this is being written on September 19. There are still colonies producing honey particularly in the Central West and the South Central areas, extending over into the prairie states. Naturally the northern boundary states are now past any crop. There will perhaps have to be some feeding but throughout the entire United States, we believe there will be less than the normal amount of feeding for winter stores.

HONEY PRICES

Such conditions being as they are, it is not surprising that honey prices are not only holding up to last year but considerably above with a definite feeling on the part of the producer that he wants to get quite a bit above last year. We have several producers who state they are trying to get 15 cents for their crop or hold it. Fifteen cents, of course, is an average price now in the eastern sections but in the Southeast it will run from 13 to 14 cents and this extends perhaps over into Texas.

In the Central West most reports are of sales at 14 to 14½ cents with some as low as 13 and others as high as 15 cents. Wisconsin likely is running about 13½ cents although some sales have actually been made at 15 cents. Going farther west Montana apparently is not expecting to accept less than 15 cents on any of their crop, no doubt anticipating the possibility of the movement northward into Canada. The short areas like Nebraska, of course, are in the best situation for such producers, as have honey, to ask a very good price for it.

We are personnally surprised that the range of prices is so much above last year with a much greater tendency on the part of the producer to hold for a price in the neighborhood of 14 cents, cans to be returned. This will hardly average in California although very good white stock is moving still at a price of 14 to 16 cents when we include the orange. There even is a tendency for amber grades to move up from 1 to 3 cents over last year's rather unfortunate prices.

On the whole, prices will likely "hang" about where they are now except there may be some stiffness when a packer has to replenish his stocks.

In the Canadian provinces apparently some of the prairie provinces, where the crop has been good, are anticipating perhaps a little drop in price of from 1 to 2 cents per pound but will still hold it above the average U.S. prices. One reporter up there stated 250 pounds per colony so it is not surprising if there are enough bees that there would be a tendency for some of the producers to "drop."

In Ontario, there will no doubt be great possibilities for getting rid of the surplus that was carried over from last year due to the shorter crop this year.

SUMMARY

On the whole the recommendations of the Minnesota people at the Detroit Lakes meeting earlier, I think, are being pretty well carried out or perhaps increased somewhat over their recommendations which are as follows:

Raw honey to packer .14 f.ob. producer's point in cans or barrels.

1 lb. Jars	$6.25—$6.75
2 lb. jars	5.75— 6.10
3 lb. jars	4.00— c/6
4 lb. jars	5.25— 5.50
5 lb. pails	5.75— 6.25
8 oz. 24/c	3.75— 4.00
60 lb. tins - Amber .17	White .19
11 oz. 24/c	5.60
20 oz. 24/c	8.00

Crotalaria and Soybeans

The Soybean Digest for July indicates that soybean processors are refusing generally soybeans containing crotalaria seed. The crotalaria seed is slightly smaller than the soybean, but hard to distinguish and hard to separate. Laboratory tests show that crotalaria is highly toxic to poultry and livestock and a stunt to their growth.

States in the Southeast where crotalaria has been mostly grown are urging farmers to discontinue producing crotalaria. It is now grown for soil improvement and for conservation and has a rank growth. Pellett (American Honey Plants) reports crotalaria as of some importance for its nectar in the Southeast.

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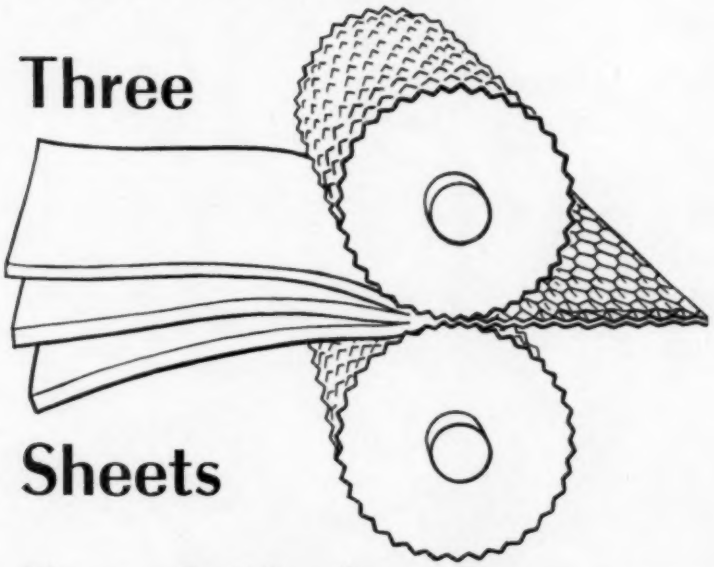

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